LIBRARY OF CONGRESS
COPYRIGHT
OCT 22 1888
564

PRICE 15 CENTS.

OCTOBER 20, 1888.

THE AMERICAN ARCHITECT AND BUILDING NEWS

VOL. XXIV. REGULAR EDITION NO. 669.

ARCHITECTURE

ENGINEERING

DECORATION

CONSTRUCTION

TICKNOR & COMPANY

BOSTON MASS.

CONTENTS.

Editorial Summary.
Builder's Hardware.—IX.
Equestrian Monuments.—VIII.
Letter from Canada.
" " Chicago.
" " Philadelphia.
" " Baltimore.
Societies.
Notes and Clippings.
Trade Surveys.

ILLUSTRATIONS.

Doorway to House at Boston, Mass.
(Helio-chrome issued only with Imperial Edition.)
Gothic Towers and Spires. Plates xxviii, xxix, xxx.
[Issued only with the Imperial Edition.]
Obwebetuck Inn, South Windham, Conn.
Scenes in the Place Louis XV, Paris.
Rood-screen for St. John's Cathedral, Denver, Colo.
Design for the "Aragon," Chicago, Ill.
Design for a Young Men's Christian Association Building.
Factory, New York, N. Y.

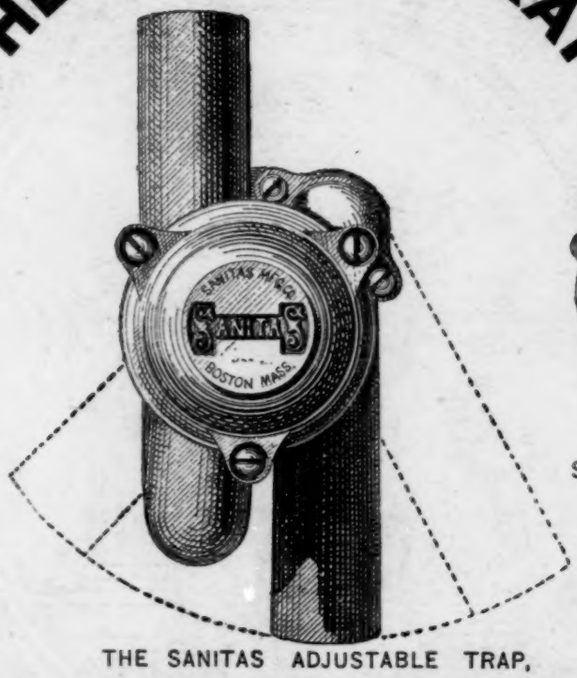
THE SANITAS "RIGHT-HAND" TRAP.

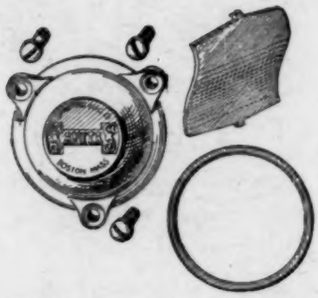
+ PLUMBING + SANITAS + APPLIANCES +

THE SANITAS "LEFT-HAND" TRAP.

THE SANITAS TRAP.

The Sanitas Full S Brass Trap.

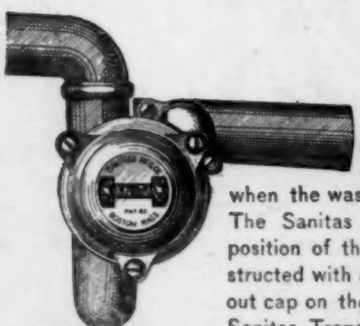




Sanitas Trap - Cup, Partition, and Washer.

THE SANITAS ADJUSTABLE TRAP.

The Sanitas Trap is made in various forms to suit varying positions of the fixture, outlet and waste-pipes. The Sanitas "Right" and "Left-Hand" Traps are the forms which will be found most convenient when the waste-pipe must be carried laterally to the right or left respectively. The Sanitas adjustable or universal Trap is designed for use where the position of the waste-pipe is not known beforehand, the outlet arm being constructed with a novel swivel joint made tight in the same manner as the clean-out cap on the body, with an ordinary screw-driver, or it can be soldered. The Sanitas Traps are not only the easiest to set, but are the only perfectly reliable anti-siphon self-cleaning, traps known.



RUNNING TRAP.

HALF S TRAP.

This Trap, whether vented or unvented, is a perfectly safe barrier against Sewer-Gas.

THE "SANITAS" MANUFACTURING CO., 207 TREMONT ST., BOSTON, MASS.

Branch Offices: 64 Gold Street, New York, N. Y. 229 Walnut Street, Cincinnati, O. 47 to 49 Dearborn Street, Chicago, Ill.

SOLE AGENTS FOR CALIFORNIA: ARNOLD & CO., 40 CALIFORNIA STREET, SAN FRANCISCO.

THE AMERICAN ARCHITECT AND BUILDING NEWS.

VOL. XXIV. Copyright, 1888, by TICKNOR & COMPANY, Boston, Mass. No. 669.

OCTOBER 20, 1888.

Entered at the Post-Office at Boston as second-class matter.

CONTENTS

SUMMARY: —
Sanitation and Population. — A Hint to Life Insurance Companies. — The Effect of Painted Walls upon Pulmonary Complaints. — A Device for Drying Walls. — Painting Masonry. — Art Schools of the Metropolitan Museum of Fine Arts. — Russian Enterprise. — The Keely Motor once more. . . . 177
BUILDERS' HARDWARE. — IX. . . . 179
ILLUSTRATIONS: —
Doorway to House of Henry C. Jackson, Esq., Boston, Mass. — Gothic Towers and Spires. Plates 28, 29, 30. — Obwebetuck Inn, South Windham, Conn. — Scenes in the Place Louis XV, Paris. — Rood-Screen for St. John's Cathedral, Denver, Colo. — Design for the "Aragon," Chicago, Ill. — Factory, New York, N. Y. . . . 182
EQUESTRIAN MONUMENTS. — VIII. . . . 182
LETTER FROM CANADA. . . . 184
LETTER FROM CHICAGO. . . . 185
LETTER FROM PHILADELPHIA. . . . 186
LETTER FROM BALTIMORE. . . . 187
SOCIETIES. . . . 187
NOTES AND CLIPPINGS. . . . 188
TRADE SURVEYS. . . . 188

THE *Sanitary News* gives the substance of Dr. Edwin Chadwick's recent address before the Association of Sanitary Inspectors of Great Britain, which contains much food for thought. One point which is particularly noticeable in this, as in most other reviews of the progress of sanitary science, is the certainty with which the death-rate can be diminished in a given locality by well-known sanitary measures. As an illustration of this, Dr. Chadwick recalls the rigid system of inspection and disinfection adopted in England in 1881, when the cholera had gained a foothold there, and points out that, judging from the effect of the pest in Sweden, which had then a normal death-rate lower than that of England, but which took no effective precautions against cholera, the saving to England must have been at least fifty thousand lives. Since then, more experience, and larger authority, have enabled sanitarians to show the result of their efforts in the general death-rate, which, for England and Wales, has fallen from twenty and five-tenths, in 1880, to eighteen and eight-tenths in 1887. According to Dr. Farr's tables of the average value of lives, the saving in money to the kingdom effected in this way now amounts to nearly forty million dollars a year. Much more remains to be done. It is obvious that the country villages and smaller towns, which have not yet come under the sanitarian's authority, do, as yet, nothing to reduce the average death-rate, and even in the cities the work of sanitation is hardly more than begun, but the hopefulness of the prospect may be judged from the fact that in London, where not long ago the death-rate was twenty-four per thousand, it was last year fourteen or fifteen. Dr. Chadwick modestly says that he cannot ascribe so great a gain to sanitation alone, and thinks that it must have been due in part to climatic causes; but the fact remains that there are living to-day in London thirty-six thousand persons who would have died during the year under the old conditions. To show the full significance of this, we will imagine the death-rate of Great Britain to be now the same as that of London twenty years ago, and assume that the population under these circumstances remains stationary, the births just making up for the deaths. Supposing a sanitary reform to be instituted which reduced the annual death-rate, as in London, from twenty-four to fifteen in the thousand, it is easily shown that this saving of life alone would double the population in about fifty years.

POLITICAL economists are not agreed whether this would be an advantage to Great Britain or not, but there is no doubt in regard to less densely settled countries. In France, for instance, where the population is rather diminishing than increasing, the Government, as an encouragement to early marriages and large families, now offers to educate at the public expense the seventh child in every family. This may have some effect, but, to judge from Dr. Chadwick's figures, the money spent in this scheme, if used in abolishing the cesspools and "fosses" of Paris and other French towns, and in administering soap and water to the inhabitants of the villages, would increase the population, by saving French lives, more in a year than the seventh-child device would do in a decade. So closely connected are cause and effect in these matters, that Dr. Chadwick suggests that an experienced sanitarian might make a contract for the reduction, for instance, of the death-rate of Manchester, which is now twenty-seven in the thousand, to sixteen per thousand, receiving suitable concessions in the way of permission to build sewers and disinfect houses. The city would gain enormously by such a contract, not only in the saving in population, but by the increased health and ability to labor of all citizens, while the contractor might, Dr. Chadwick thinks, do the work at a profit for a compensation amounting to not more than one-third the premiums annually paid for insurance against sickness and death. This is not, perhaps, so impracticable a scheme as might appear. It would probably be difficult to adjust the methods of making payments to such a contractor, or to persuade the life-insurance companies to allow anything from their premiums toward paying him, but there is no reason why the life-insurance companies should not do the work themselves. A great change has recently come over the methods of fire insurance in this country, the underwriters now in many cases making earnest efforts to examine and classify risks, to suggest measures for preventing fires, and to keep the premises they insure under careful inspection. They will undoubtedly be well repaid for their trouble, and the life-insurance companies might easily imitate them. After a policy-holder in a life-insurance company has been examined and accepted, it would not be very difficult, or extremely costly, to keep the place where he lives under inspection, to suggest sanitary improvements, and, on occasion, apply disinfectants, or use other means to avert danger. The list of preventable diseases is already long, and is growing longer, and a study of the modes of attacking them, with practice on occasion, is as legitimate for a life-insurance company as the maintenance of a patrol, or a provision of waterproof covers, is for the fire companies. Moreover, a life-insurance company which interested itself sincerely in the health of its policy-holders would gain greatly in popular notice and confidence. However willing a business man may be to sell his own insured stock to the underwriters, no one over-insures his life, or tries to defraud the insurance companies by dying. On the contrary, the interests of insurer and insured are here identical. The insurance companies wish all their policy-holders to live to extreme old age, and the policy-holders are not only quite disposed to do so, but will be grateful for all the warnings, suggestions and advice which the properly qualified experts of the companies may offer to promote the object which both parties desire. What would be the profit to the first insurance companies to carry out such a plan may be inferred from the fact that a reduction of the death-rate, such as has been easily effected by sanitary measures in large towns in England, corresponds to an addition of five years to the average length of life. Supposing that life-insurance policy-holders pay, as an average, twenty years' premiums, which we imagine to be rather over than under the truth, a lengthening of the average life of policy-holders to the extent of five years would mean an increase in premiums received of twenty-five per cent, and an increase in profits of at least twice that amount.

THE *Wiener Bauindustriezeitung* is strongly in favor of painting the outside of brick or stone buildings, as a means of repelling dampness from them. It acknowledges that many scientific persons oppose the painting of walls of masonry, on the ground that ventilation through them is thus prevented, but it believes that where the transfer of air through the walls exists, its value is more than counterbalanced by the facility with which the masonry becomes saturated with moisture. In support of its observations, it cites the example of two houses, standing side by side, facing the rainy quarter of the compass. One of the houses has the front painted in oil; the masonry of the other is left bare, and after a heavy rain is almost black with the water which it has absorbed. In this house dwells a family of persons not constitutionally subject to rheumatic or

pulmonary complaints, or catarrhs, but since taking possession of the building every member of the family and inmate of the house has been ill with rheumatism or catarrhal affection; while the dampness of the air in the rooms is indicated by the peeling off of the paper from the walls, and by the persistent smell of tobacco-smoke, a certain sign, we are informed, of a moist atmosphere. The painted house is inhabited by a family of consumptive tendency, yet no member of it, or other inmate of the house, has suffered from pulmonary or rheumatic disease, although, after a very heavy and continued rain, the cellar has been flooded with water. So far as ventilation by open windows is concerned, the two houses have been similarly treated, and the only difference between them appears to consist in the paint on the outside walls.

THE same useful journal also mentions a device for keeping walls dry which may be of value. Where a brick wall, plastered on the brickwork like all walls in Vienna, shows dampness on the inside, after being exposed to rain, the plastering should be removed, the mortar scraped out of the joints of the brickwork to the depth of half an inch, and the whole then painted over with hot coal-tar or asphalt. After this is hard, a new coat of plaster may be spread over it, and finished as if there were no coal-tar under it. If the new plaster should not adhere to the asphalt, as often happens, a rough surface should be given it by throwing sand over it while the asphalt is still warm, or, we might add, by throwing hot sand at it even after the coating had become cold and hard. This gives a texture to which a hard-finish, or other second or third coat of plaster will cling indefinitely. If coal-tar is used, with ordinary plaster over it, the disagreeable smell of the coal-tar or asphalt will come through the plaster coat into the room, but this may be prevented almost entirely by mixing the plaster with cement or hydraulic lime.

THE Massachusetts State Board of Health once made an investigation into the effect of the construction of dwelling-houses on consumption, and found that the proportion of consumptive patients was greatest in stone houses, and next in brick houses, and that it was smallest in wooden houses. Dry as our climate is, therefore, it is by no means impossible that paint might with advantage be applied more to masonry with us than it now is. A hundred years ago it was fashionable to paint brick buildings white, and many charming old structures remain to attest the value of the coat of paint in preserving the masonry, and its pleasant and homelike effect as a foil to the vines and shrubs with which even city houses are now commonly adorned. If it should prove, as might easily be ascertained, that the painted brick houses preserve their inhabitants more effectually from sickness and premature death than the unpainted ones, it would be worth while to revive the ancient fashion, and, with our greater resources in the way of materials and ideas, exterior coloring might become as important an accessory to the architecture of the twentieth century as it was to that of the twelfth and thirteenth.

WE have received the announcement for the coming season of the Art Schools of the Metropolitan Museum of Art, which are to be, as before, under the management of Mr. Arthur Lyman Tuckerman. Mr. Tuckerman, in addition to the general supervision of the schools, conducts the courses in Architecture, which are so arranged as to prepare pupils, who desire it, in three seasons for admission to the Ecole des Beaux-Arts in Paris. For those who wish only to perfect themselves in drawing, design and mathematics, while regularly engaged in offices, lectures and exercises are arranged to occupy only one-half of each day. Besides the courses in architecture, the schools provide classes in elementary drawing, painting and drawing from the antique and the round, as well as from the life, and in modelling and sculpture; any or all of which the young architect might pursue with great advantage. The instruction is the best that can be obtained in New York, the hours are divided between forenoon, afternoon and evening, so as to accommodate as many persons as possible, and the cost of tuition is extremely moderate, the fees for the whole course in Architecture being but twenty-five dollars for the school year, while those for the evening classes in drawing and modelling are fifteen dollars each; and in the School of painting, which is under Mr. Cleveland Coxe, the price is thirty-five dollars for daily instruction, either morning or afternoon, during the school year, or forty dollars where pupils attend both the morning and afternoon classes.

WE are so pertinaciously called upon by politicians to wonder and rejoice at the extreme prosperity of our own country that it does not often occur to us to look about and see whether any of the nations which live under a less admirable government ever dream of emulating American enterprise and development; and if any of us happen to notice a foreign undertaking, such for instance, as the Trans-Caspian Railroad, and to observe that it is intended to be about five times as long as our Pacific road, and has been built about four times as fast, he is so frowned upon and decried by the professed mouth-pieces of public sentiment that he finds it safest to keep his eyes fixed upon the unapproachable material felicity which he and his neighbors are supposed to be enjoying at home. For all this, there is instruction to be derived by sensible men in looking abroad once in awhile, and it is curious that, whereas America was once the chosen land of "booms," real estate speculations, and mushroom towns, while Europe was all conservatism and fixity of values, the conditions are now rapidly changing, and while land throughout most of the United States is stationary or retrograding in value, Europe is full of real estate "booms" and speculations, and towns spring up and grow with a vigor rarely approached here. To say nothing of the extraordinary transformation of the desert around the Caspian Sea, which followed the development of the ancient Baku oil-wells by the Nobel Brothers, many other portions of Russia, Germany, France and England are rapidly outgrowing the geography. The Black Sea, particularly, in the changes which are taking place on its shores, reminds one of our own lakes, with their great ports of internal commerce. Odessa, which now attracts attention alternately to the ferocity of its Christian inhabitants, its fondness to anarchist plots, and its great commercial importance, was, ninety years ago, a miserable little Turkish village, with a few hundred inhabitants, but no harbor or shipping. Now it has a population of two hundred and fifty thousand, and four thousand vessels enter its port every year. Its harbor, famous as it is, is almost purely artificial. A century ago the indentation of the coast on which it lies was open to all winds from the southeast to the northeast, and the waves driven by the southeasterly wind, which is the most violent one in the Black Sea, swept the bay from end to end. In 1794, under the Empress Catherine, the first stone was laid of a small breakwater at the southeast corner of the bay. The work went on slowly and roughly, but every stone added to the mole gave shelter to a few more inches of harbor, and traffic kept pace with the safeguards provided for it. Improvements were demanded, and made, one by one, until now the southeast mole has become a magnificent work, one hundred and forty feet wide and nearly two miles long, with stone pavement, cut stone revetment on both sides, and a high stone parapet on the side toward the sea. This, however, is but a small part of the engineering which has made the present harbor of Odessa. At the opposite extremity of the city another mole projects about half a mile northeasterly into the Black Sea, then turns, forming nearly a right angle, and continues until it nearly meets a third mole, projecting straight northeasterly from the shore, inclosing a basin; and two more moles of less length divide the water-front of the town into four distinct harbors, all protected from the southeast winds by the great Quarantine Mole and its extension, and from the east and northeast by a work hardly less important, the huge breakwater, a mile long, which compietely shelters the entrance to the harbor, leaving only a narrow, protected entrance at each end.

IT seems that the Keely motor, which, after a very profitable experience of several years in this country, suffered, a few weeks ago, a cruel blow in the shape of a mandate from court requiring that the principle of its operation, or non-operation, should be explained, has sought consolation for this injury abroad, where its manœuvres in connection with its shareholders' pockets can be carried on without interference from Pennsylvania courts. Singularly enough, the first announcement of its appearance in France couples it with Commandant Renard's balloon, which it is said to have made perfect by supplying the necessary motive-power; but we do not find that any one has yet seen the motor driving a balloon through the air, and imagine that many French stockholders will bleed severely at the pocket before this anticipation is realized.

BUILDERS' HARDWARE.[1]—IX.

SPECIAL HINGES.

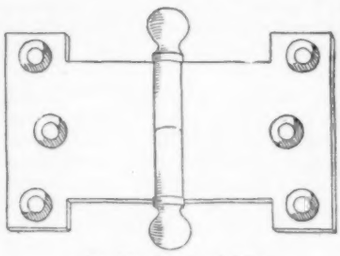


Fig. 88. Parliament Butt.

PARLIAMENT-butts are shaped like Figure 88. They are intended to be used on very thin doors or shutters where considerable space is needed for the screws. They are made in several varieties of design and finish. Figure 89 is a hinge used almost exclusively for wash-trays. Figure 90 is a form of chest hinge somewhat similar to that shown by Figure 67. There are also several forms manufactured for hanging inside-blinds. Figure 91 is the common form for ordinary blinds in two folds. The same is made with either fast or loose pin, and there are several varieties with ornamented surfaces. They are more specifically designated as "shutter flaps." Figure 92 is a form of shutter-hinge used for shutters which fold back over each other, as shown by the cut.

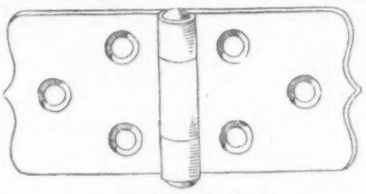


Fig. 89. Wash-Tray Hinge.

Figure 93 is a hinge which is very convenient to use for water-closet seats, double-hinged lids, etc., the central flap being screwed to the seat, while one of the outer flaps serves for the seat cover and the other is attached to the frame at the back.

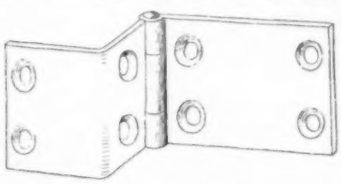


Fig. 90. Chest-Hinge.

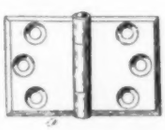


Fig. 91. Inside Blind-hinge.

Figure 94 is a pivot or centre hinge to go underneath and above a door. Figure 95 is used for much the same purposes. Figure 96 is a form of wardrobe hinge. Besides these there are many special forms of hinges used in connection with furniture and a few for more strictly building purposes, none of

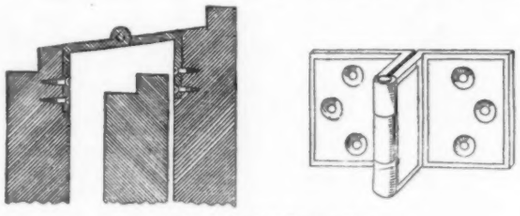


Fig. 92. Three-fold Shutter Flap.

which, however, are of any special value or interest, except the hinges used for double-acting screen-doors, that is to say, doors which swing both ways. Most of these are fitted with springs and will be considered later on, but the form represented by

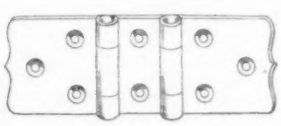


Fig. 93. Water-Closet Seat Hinge.

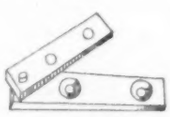


Fig. 94. Pin or Centre Hinge.

Figure 97 is peculiar to itself. It is rather hard to appreciate it clearly from the drawing, but the sectional plan will make the arrangement more easily understood. The figure shows the hinge as it would appear when opened out. It really consists of three separate double-acting hinges, each as shown by the plan. A similar hinge is made with two sections instead of three.

[1] Continued from No. 668, page 168.

Figure 98 is even more puzzling, at least, no drawing can illustrate it clearly, though the thing itself is easily understood. Its action is on exactly the same principle as Figure 97. The

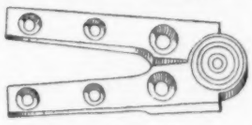


Fig. 95. Quadrant Hinge.

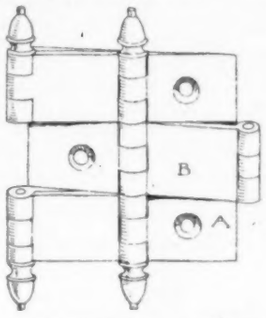


Fig. 97[1]. Screen-Butt. A. G. Newman.

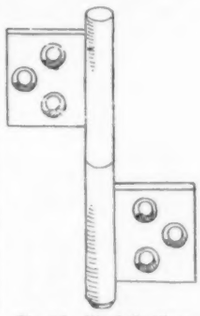
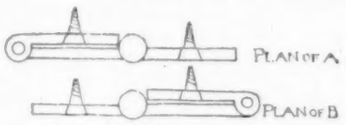


Fig. 96. Wardrobe Hinge.



97[2]. Screen Butt.

curved connecting pieces are between the two main hinge plates when the door is shut. For clearness the hinge is shown both in sections and put together. If the plate *C* be fastened the door frame, when the door is opened towards the left the

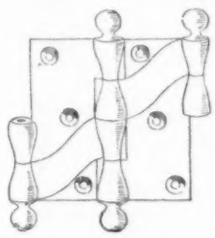


Fig. 98. Screen Butt.

plates *D* and *B* will revolve together about the axis 1, 1, taking the position shown by the figure. If, however, the door is opened in the contrary direction, the revolution is about the axis 2, 2, the plates *D* and *A* turning together.

SPRING HINGES.

One of the simplest forms of spring hinge is that shown by Figure 99, consisting of a single spiral coil spring about a hinge pin, so arranged than when the door is opened the spring is twisted more tightly, and by its resistance tends to close the door. The lower flange is secured to the door frame, and in setting the hinge the spring is brought to a proper tension by turning up the hinge pin, holes being pierced in the bottom of

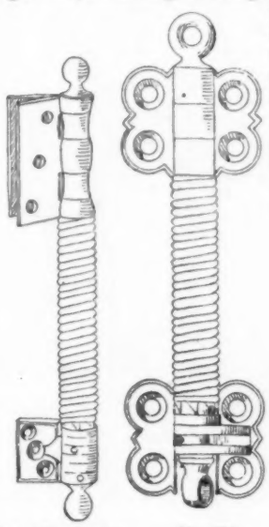


Fig. 99. Garden City Spring Butt. Chicago Spring Butt Co.

Fig. 100. Garden City Spring Butt. Chicago Spring Butt Co.

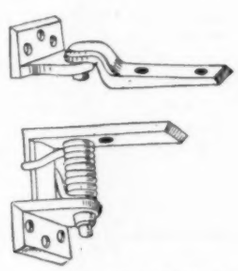


Fig. 101. Keene's Double-acting Saloon-Door Hinge. Chicago Spring Butt Co.

the pin, as shown, to facilitate the use of a lever, while a shoulder, dropped into one of the holes, bears against the fixed flange and prevents the spring from uncoiling. Figure 100 is

a spring hinge to be planted on the face of the door and the door frame, the spring being turned up by using a bar in the hole through the bottom of the pin, and kept from uncoiling by the ratchets shown in the lower portion. Both of these hinges are for single swinging doors.

Figure 101 is a light form of double-acting spring hinge suitable for fly doors which are set up from the floor, and do not extend to the top of the door frame. Its action will be readily understood by reference to the figure.

Figure 102 represents a double-acting spring butt of the same general form as the single-acting butt, Figure 99. The springs are turned up and secured in essentially the same manner and the appearance is the same. This form really embodies the principles of nearly all the varieties of spring hinges, the differences being in appearance and in compactness of construction rather than in the workings. Two styles, the "Empire" spring hinge, Figure 103, and the "Star" spring hinge, Figure 104, will fully serve as types of a great variety of double-acting spring hinges listed in the catalogues of the various manufacturers. In the "Empire" spring hinge the coiled springs are exposed to view, and are tightened by inserting a lever in the cogs at the bottom of the hinge and drawing it around until the catch *A* on the top of the hinge pin is held by a little projection on the hinge plate. In the "Star" hinge the springs are encased, though they are set up in essentially the same manner. Both these hinges are excellent of their kind and are about as good as anything in the market.

Fig. 102. Garden City Double Acting Spring Butt. Chicago Spring Butt Co.

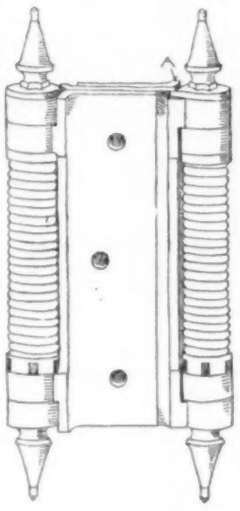


Fig. 103. Empire Spring Hinge. Van Wagoner & Williams Co.

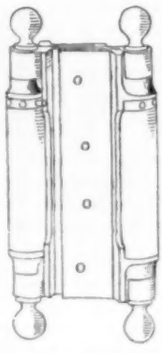


Fig. 104. Star Spring Hinge. Van Wagoner & Williams Co.

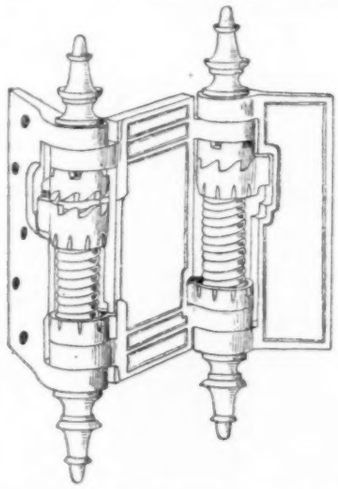


Fig. 105. Crown Spring-hinge. Van Wagoner & Williams Co.

Figure 105 shows the "Crown" hinge, a form which permits of a little nicer adjustment than the others in that the ratchets about the spiral spring are quite close together and the tension can be increased to any desired strength. This is a strong and durable hinge, although none of the foregoing hinges should be used for outside work, as they are liable to rust and clog.

All of the preceding double-acting hinges necessitate two coil springs. Figure 106 shows a form of double-acting spring butt in which the force is derived entirely from a single strong coil, which is concealed when the door is closed, working in the thickness of the door. This hinge has generally proved very satisfactory in use and is much called for, being very neat and tidy in appearance, and it is especially adapted for light interior doors, where it is desirable that the hinges shall be as inconspicuous as possible.

The simplest double-acting hinge, however, is the "Champion" spring hinge, shown by Figure 107. This is about as convenient and satisfactory a door-spring as is in the market, consisting of a single spring operating for either swing of the door. A catch on the hub of the lower jamb plate resists the door in one direction, while a corresponding catch on the upper plate resists the tension in the opposite direction. These hinges look neat in place and are very easily applied, and, having no complicated machinery about them, are not likely to get out of order.

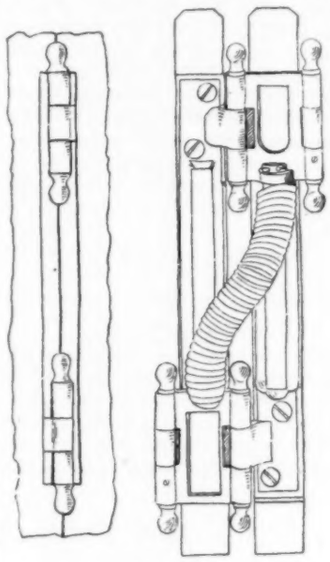


Fig. 106.

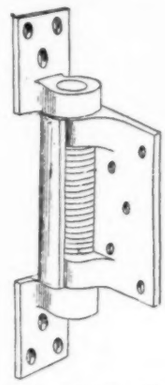


Fig. 107. Champion Spring-hinge. Chicago Hardware Co.

A hinge which has the appearance of considerable complication is the Jewett spring butt, shown by Figure 108. This butt, however, has many excellent qualities. It consists of four separate springs, two on each side. It will be seen by the plan that when the door is opened the tension is brought on the springs by aid of the push-bar or pin, A, which fits on the shoulder between the two springs and on a ratchet attached to the central hinge-plate. The springs can easily be released from their tension without taking off the door, by simply removing the push-bar, and, owing to the manner in which the springs are attached, they exert their greatest power when the door is closed, the force gradually decreasing as the door is opened. Another good quality is that, as there are four springs, if their combined power is too great for the door, any one of them can be released singly, without affecting the action of the others, and the tension of the spring brought to any point. It is also possible to replace a spring without taking the butt off the door, something which can be done with very few other makes. The only objection to the hinge in our mind is that it is complicated in its appearance and also that the springs are held in place by a moveable push-bar, which, under some circumstances might be knocked out of position and lost, in which

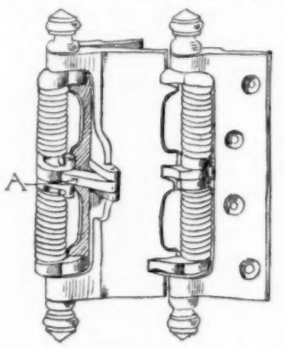


Fig. 108*a*.

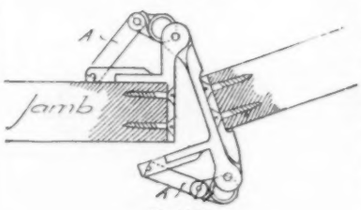


Fig. 108*b*.

case the hinge would be practically useless. On the whole, however, it is a most excellent hinge.

The "Union" spring hinge, Figure 109, is a form in which the resistance is derived from flat band springs. The peg shown above the spring is moveable, and by turning up the hinge-pin

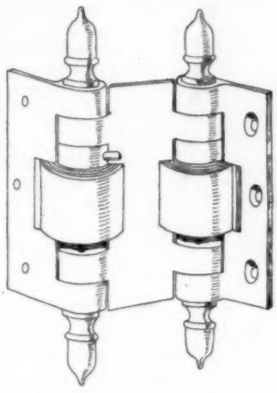


Fig. 109. Union Spring-hinge.
M. W. Robinson.

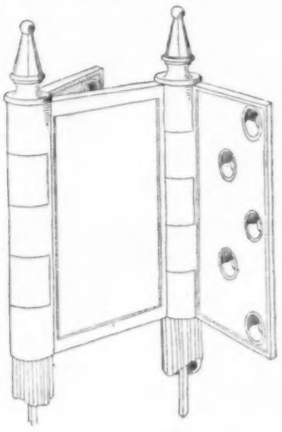


Fig. 110a.

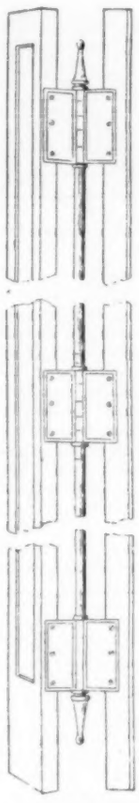


Fig. 110b.

the peg can be set in any of the holes in the pin, as may be necessary to retain the desired resistance. One end of the band spring is fastened to the hinge-pin and the other hooks into a slot on the adjoining hinge-plate. The hinge illustrated is intended for light doors. For heavier work a hinge is made with four such springs, two on each hinge-pin.

Figure 110 shows a form of spring butt which depends for its action upon the torsion or twisting strain in a steel rod,

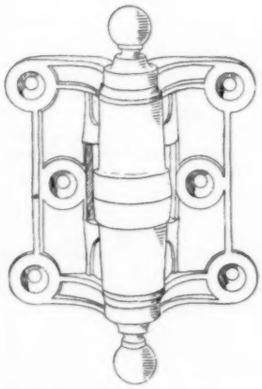


Fig. 111. Hero Spring-hinge.
Van Wagoner & Williams Co.

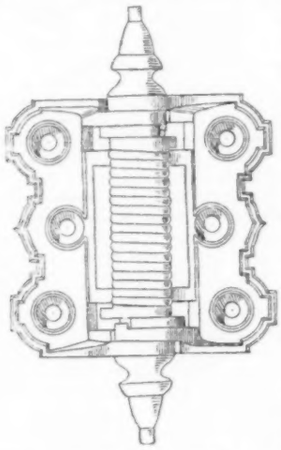


Fig. 112. Nickel Spring-hinge.
Coleman Hardware Co.

which is carried from the bottom to the top of the door.

The disadvantages of nearly all of the forms of spring hinges previously considered is that they are apt to cause the door to slam, and the door cannot be kept open except by placing something against it. Spring hinges which will keep the door open or cause it to close are peculiarly an American invention and one of the most ingenious of its kind.

There are four leading styles of hinges which have a hold-back feature. They are the Hero, Figure 111; the Nickel, Figure 112; the Devore, Figure 113, and the Wiles, Figure 114. All of these hinges are necessarily single action. They are alike in that they are planted on the face of the door and door frame, and are delivered ready to be set, with the tension fully applied. The principle on which they work is simply this: The spring is coiled about a shank entirely disconnected from the pin of the butt and either united to the butt plates by top and bottom pieces which hook on the opposite sides of the

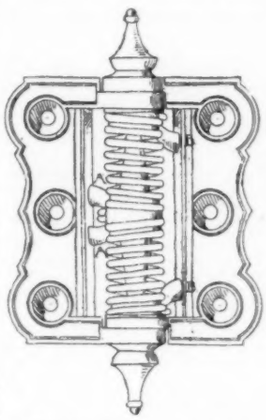


Fig 113. Devore Spring-hinge.
Freeport Hardware Mfg. Co.

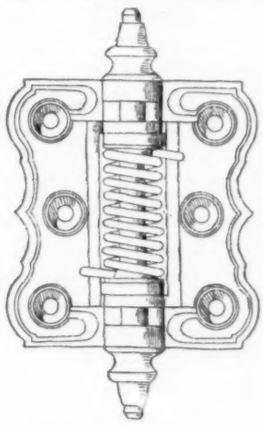


Fig. 114. Wiles Spring-hinge.
Freeport Hardware Mfg. Co.

hinge, as in the Nickel and the Wiles hinges, or with the springs themselves directly hooked onto the hinge-plates. In the Devore hinge two springs are used, the ends caught at the centre on one leaf *A*, while the outer ends catch on hooks at *B*, *B*. In this way, it will readily be seen that as the hinges open, the hooks to which the spring is attached are separated from each other, and consequently the spring is drawn tighter. But as soon as the hinges have passed through about three-quarters of the distance they are to swing, the horizontal distance between the points of attachment, at top and bottom of the spring becomes less, and the tendency is to draw the door open and hold it so. It is very difficult to show this action by a diagram, but Figure 115 may help to make it understood. Let *A* represent the jamb and *B* the door; *C*, a double turn of spring wire hooking on to the two arms, *D*, *D*, fastened respectively to the jamb and the door. When the door is opened, the ends of the spring are forced apart, but at the same time the spring forces itself out of centre, turning on the hooks of *D*, *D*, until, when the door has moved through 180 degrees, it is evident that the spring has both moved and turned so that the ends tend to draw the arms *D*, *D* together, rather than to push them apart.

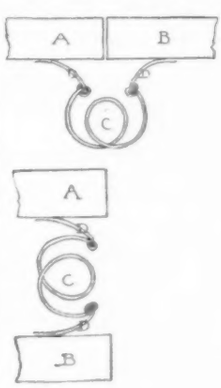


Fig. 115.

In order that the springs should be free to move, as just explained, the hinge-pins cannot extend through the butt, and the strength depends entirely on the flanges of the plates to which the pins are attached. As these cannot be made very large without rendering the hinge clumsy in appearance, it follows that the hinges can be used only for comparatively light doors. The "Hero" hinge is rather neater and apparently simpler in construction, and also has the advantage of having the hinge cased, though all the hinges are on essentially the same principle.

The metal used for the springs in connection with double-acting butts, is usually steel, in which case it is advisable that the spring should be nickel-plated, to guard against rust. Phospor-bronze is the best and most durable material to use, all things considered, though we are unable to state any

particular hinge in which it is employed. Some compositions of brass, bronze, etc., are used with varying success. The different hinges are generally made with but one kind of spring throughout, so that a choice in the metals is implied in a choice of a hinge. The metal is, however, nearly always steel, as just stated.

The following table gives the retail prices of the spring butts and hinges previously described. For purposes of comparison, the figures represent the prices in each case of the size of hinge necessary for an ordinary door, from $\frac{7}{8}$ to $1\frac{1}{8}$ inches thick; excepting, however, that the price for Figure 101 is for a light screen-door hinge The hinges are in general made in a number of sizes from those for the lightest kind of screen-doors, to those required to move doors weighing several hundred pounds.

TABLE OF SPRING-HINGES.—RETAIL PRICE PER PAIR.

Fig.	Name.	Bronzed or Japanned Iron.	Nickel Plated.	Brass or Bronze.
99	Garden City single-acting spring-butt	$ .60	$1.60	$ 4.80
100	Garden City single-acting spring-butt	.15	.75	1.80
101	Keene's saloon-door hinge	.60	1.20	4.00
102	Garden City double-acting spring-butt	.80	2.16	6.40
103	Empire spring-hinge	.25	——	——
104	Star spring-hinge	1.36	3.00	3.00
105	Crown spring-hinge	1.20	——	——
106	Chicago double-acting spring-butt	3.20	6.00	16.00
107	Champion spring-hinge	1.40	3.50	4.25
108	Jewett spring-butt	3.50	——	12.00
109	Union spring-hinge	2.50	——	7.00
110	Torsion spring-butt	4.50	——	about 12.00
111	Hero spring-hinge	.18	.33	
112	Nickel spring-hinge[1]			
113	Devore spring-hinge[1]			
114	Wiles spring-hinge[1]			

[1] We are unable to state any prices for these hinges, as they are not found in the Boston market. They would probably sell at the same prices as the Garden City Butts, Figure 100.

[To be continued.]

THE ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

DOORWAY TO HOUSE OF HENRY C. JACKSON, ESQ., BOSTON, MASS. MESSRS. ALLEN & KENWAY, ARCHITECTS, BOSTON, MASS.

[Helio-chrome, issued only with the Imperial Edition.]

GOTHIC TOWERS AND SPIRES, PLATES 28, 29 AND 30.—ST. MARY'S, ST. NEATS; ST. PETER'S, ROUNDS; ST. LEONARD'S, LODDINGTON; ST. JAMES THE APOSTLE, SPALDWICK; ST. NICHOLAS'S, COTTESMORE.

[Issued only with the Imperial Edition.]

OBWEBETUCK INN, SOUTH WINDHAM, CONN. MR. HOWARD HOPPIN, ARCHITECT, PROVIDENCE, R. I.

The building is placed upon a high plateau overlooking a beautiful country. Walls are of rough rubble, red joints. First story, clapboarded. All above, shingled, stained red.

SCENES IN THE PLACE LOUIS XV, PARIS.[1]

These illustrations are reproduced from "*Tableaux Historiques de la Révolution Française*" in connection with the article on "Equestrian Monuments" elsewhere in this issue.

ROOD-SCREEN FOR ST. JOHN'S CATHEDRAL, DENVER, COLO. DESIGNED BY MR. CHARLES R. LAMB, NEW YORK, N. Y.

This screen which was manufactured by Messrs. J. & R. Lamb, New York, is 28 feet high and 32 feet wide.

DESIGN FOR THE "ARAGON," CHICAGO, ILL. MR. L. S. BUFFINGTON, ARCHITECT, MINNEAPOLIS, MINN.

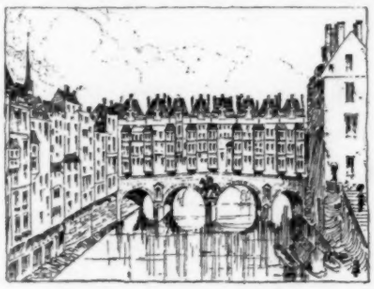
DESIGN FOR A Y. M. C. A. BUILDING. MR. WARREN H. HAYES, ARCHITECT, MINNEAPOLIS, MINN.

[1] After this plate was printed, it was found necessary, through lack of space, to defer to a later issue the description of the Statue of Louis XV here shown.

FACTORY FOR MESSRS. EDWIN C. BURT & CO., NEW YORK, N. Y. MESSRS. DE LEMOS & CORDES, ARCHITECTS, NEW YORK, N. Y.

EQUESTRIAN MONUMENTS.—VIII.[2]

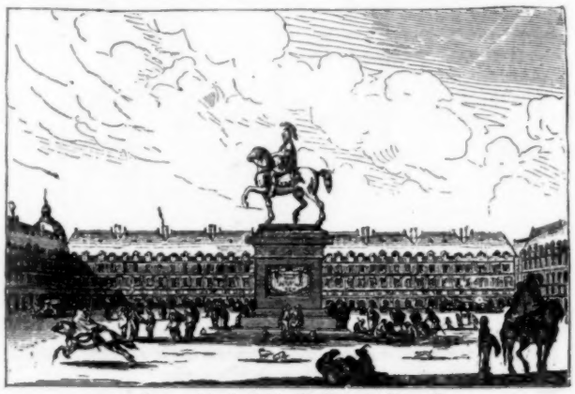
PERISHED MONUMENTS—THE FRENCH REVOLUTION.



The Statue of Louis XIII on the Pont St. Michel, Paris.

Another equestrian statue that perished, or possibly merely disappeared in the bottom of the Seine on the eleventh of August, 1792, was the statue of Louis XIII which crowned the central abutment of the Pont St. Michel, at Paris. The cut merely indicates its position. Of its size, character, material and history it has been possible to secure no other trace.

The equestrian statue of Louis XIII, which formerly stood in the Place Royale, at Paris, now the Place des Vosges, is one of the many instances of transubstantiation, so to say, that at various times have affected public statues. Catherine de' Medici, who, with true Italian vindictiveness, had avenged the death of her husband, Henri II, by torturing to death the unfortunate Montgomery, Captain of the Scottish Guards, who had accidently killed the King in a tournament in 1559, held in honor of the Peace of Cateau-Cambrésis, desired to erect a monument to his memory. Being an Italian she naturally turned to Italy for help, and as naturally applied to the greatest of Italian masters, Michael Angelo. The sculptor, because of his great age, was disinclined to undertake the commission, although it is said he made a sketch for the statue, but advised that the work should be entrusted to Daniel of Volterra, promising to aid him with suggestion and criticism. Volterra accordingly made a sketch-model, aided by Michael Angelo's advice, and it proved so satisfactory that a contract was made with him, amongst the conditions of which was that the horse should be "twenty palms high," and that it should be cast in a single piece. The modelling of the figure and the preparation for casting occupied several years, and, after all, the first attempt was a failure, a fact which so affected Volterra that, although the next attempt was successful, he became consumed with melancholy and unable to go on with the work, dying at length in 1566 shortly after the second and successful cast was made. The horse, weighing some 20,000 pounds and scaling somewhat larger than the horse of the "Marcus Aurelius," was finally finished and shipped to France; but it never received the rider intended for it, and was probably stored away to await some auspicious opportunity. For nearly three quarters of a century the horse was either stabled in darkness, or was set up somewhere as a pointless piece of equine sculpture, for it was not until 1639 that it received a rider, and then not Henri II, as intended, but a Bourbon ruler, Louis XIII. The figure of Louis was modelled by Pierre Biard, *fils*, and the statue was set up September 13, 1639, on the spot where formerly was the court-yard of the Palais des Tournelles, in which the unfortunate tilting accident took place. The pedestal of the statue bore laudatory inscriptions prepared by Cardinal Richelieu, whose happy inspiration it was to unite economy and adulation by mounting an image of his august master on a second-hand steed. The horse was considered particularly good, being somewhat light of limb and animated in action.



Statue of Louis XIII in the Place des Vosges.[3]

Inasmuch as Louis XIII was surnamed the Just, it is supposable that on August 11, 1792, the crowd proceeded to pull down his statue with less alacrity than they showed in destroying the statues of the two succeeding Louis; but down it came all the same, and when things

[2] Continued from page 170, No. 668.

[3] From M. F. Hoffbauer's "*Paris à travers les Ages.*

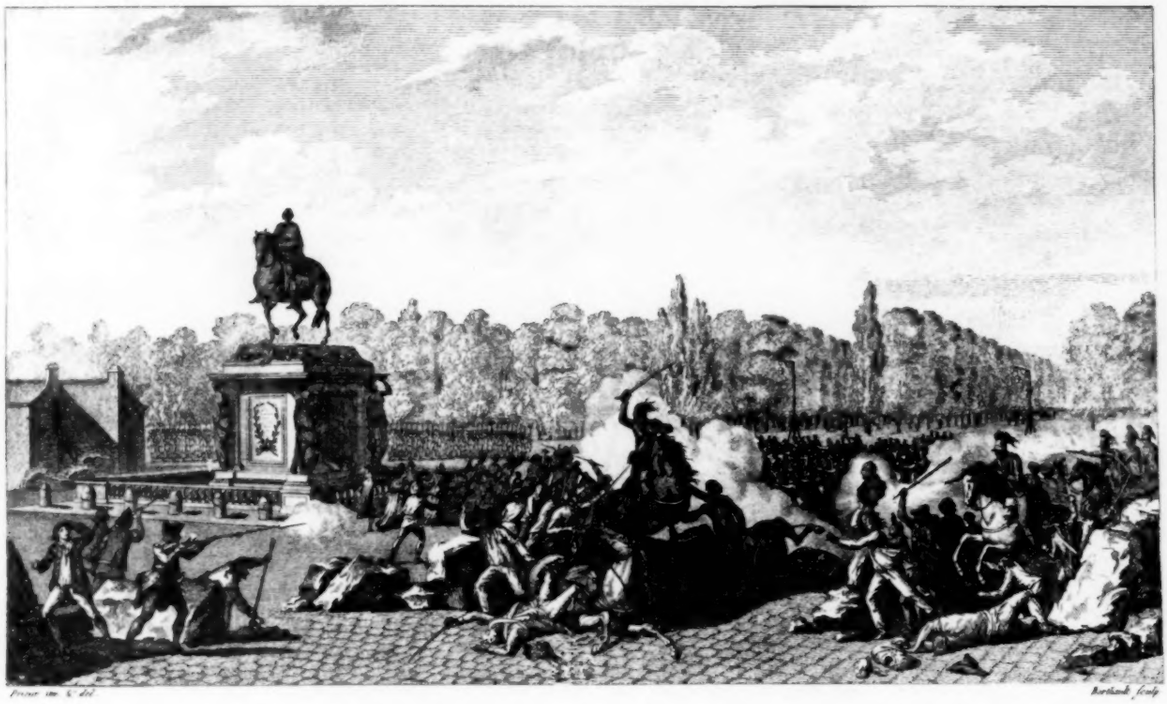
COPYRIGHT 1888 BY TICKNOR & CO.

Obwebetuck Inn.

South Windham, Conn.

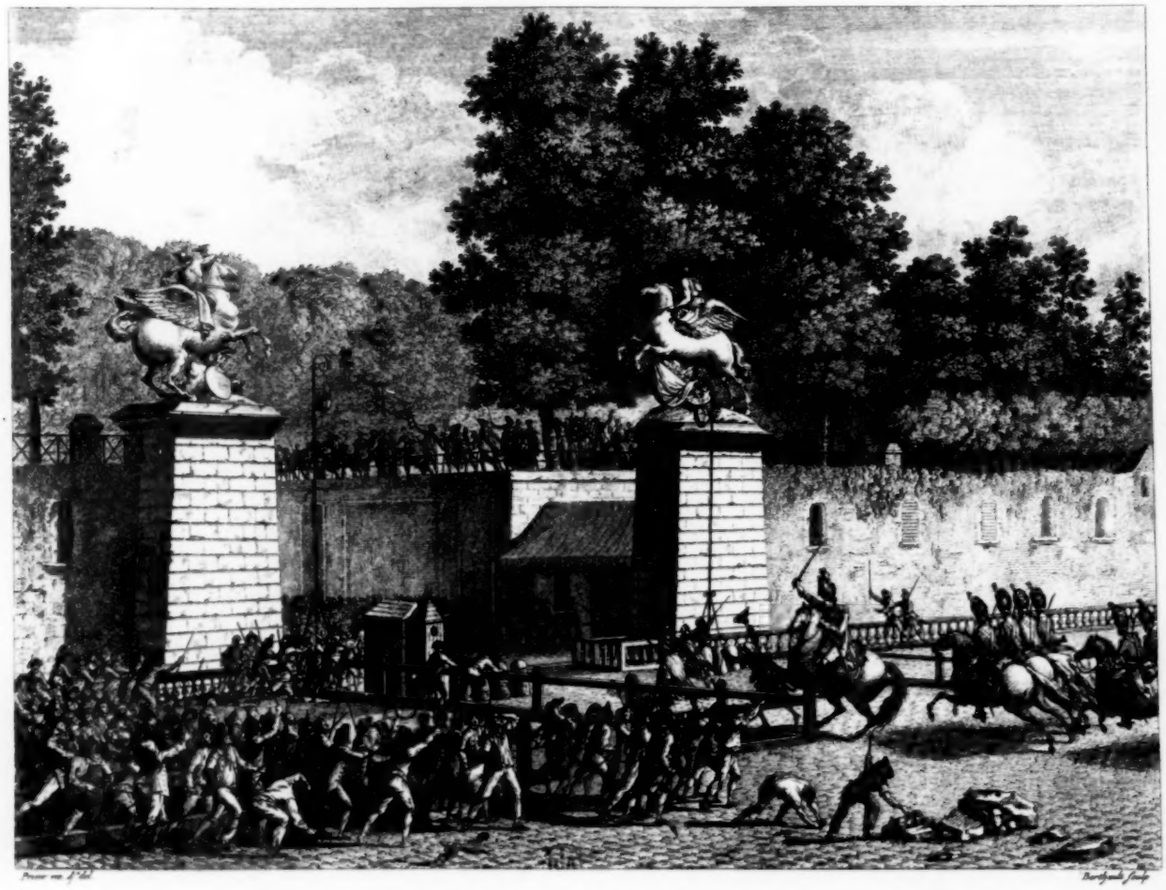
Howard Hoppin, Arch't. Providence, R.I.

COPYRIGHT 1888 BY TICKNOR & CO



LES BUSTES DE Mrs D'ORLEANS ET NECKER PORTÉS A LA PLACE LOUIS XV.

le 12 Juillet 1789

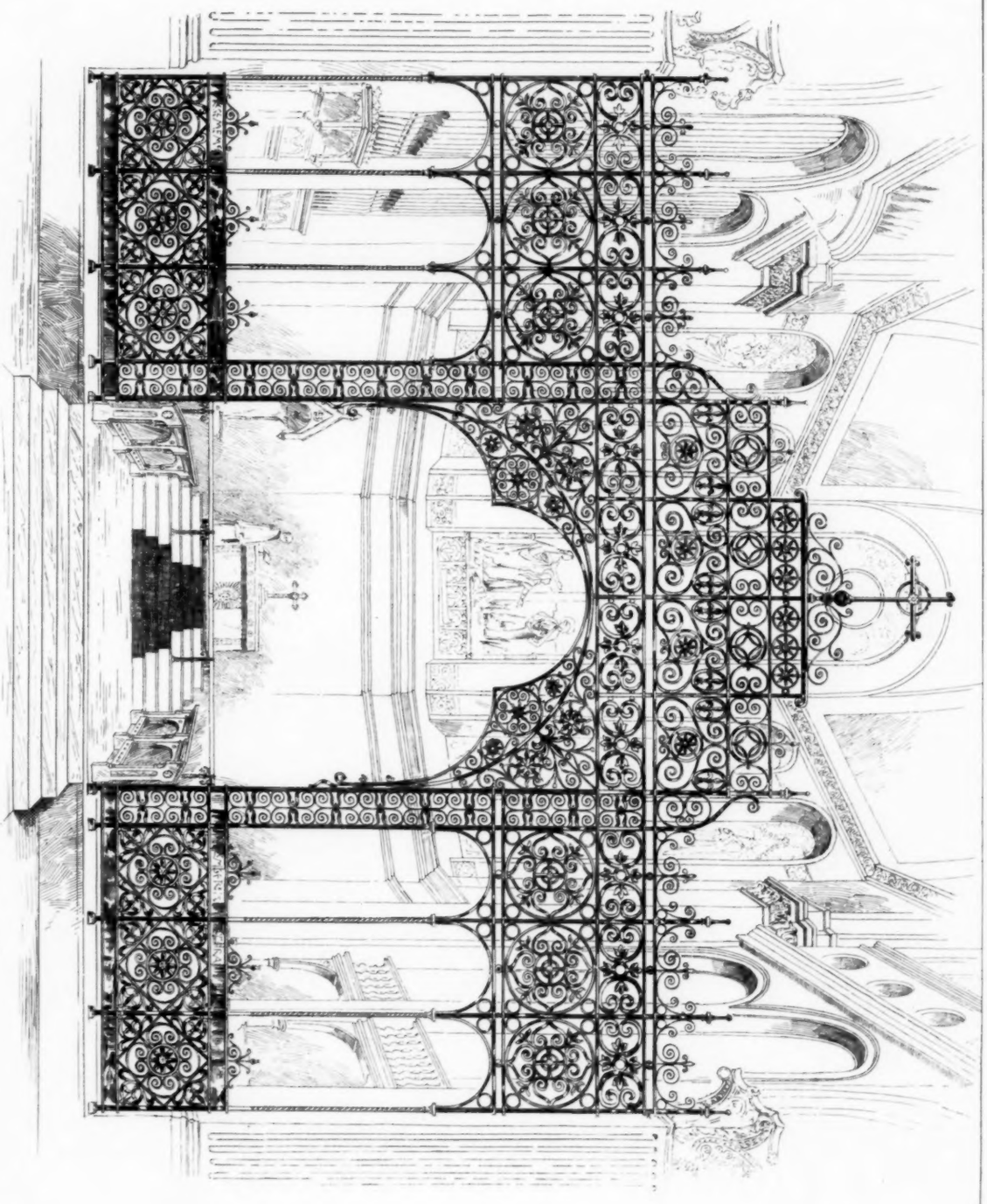


Mr DE LAMBESC ENTRANT AUX TUILERIES, AVEC UN DÉTACHEMENT DE ROYAL-ALLEMAND

le 12 Juillet 1789.

Heliotype Printing Co Boston

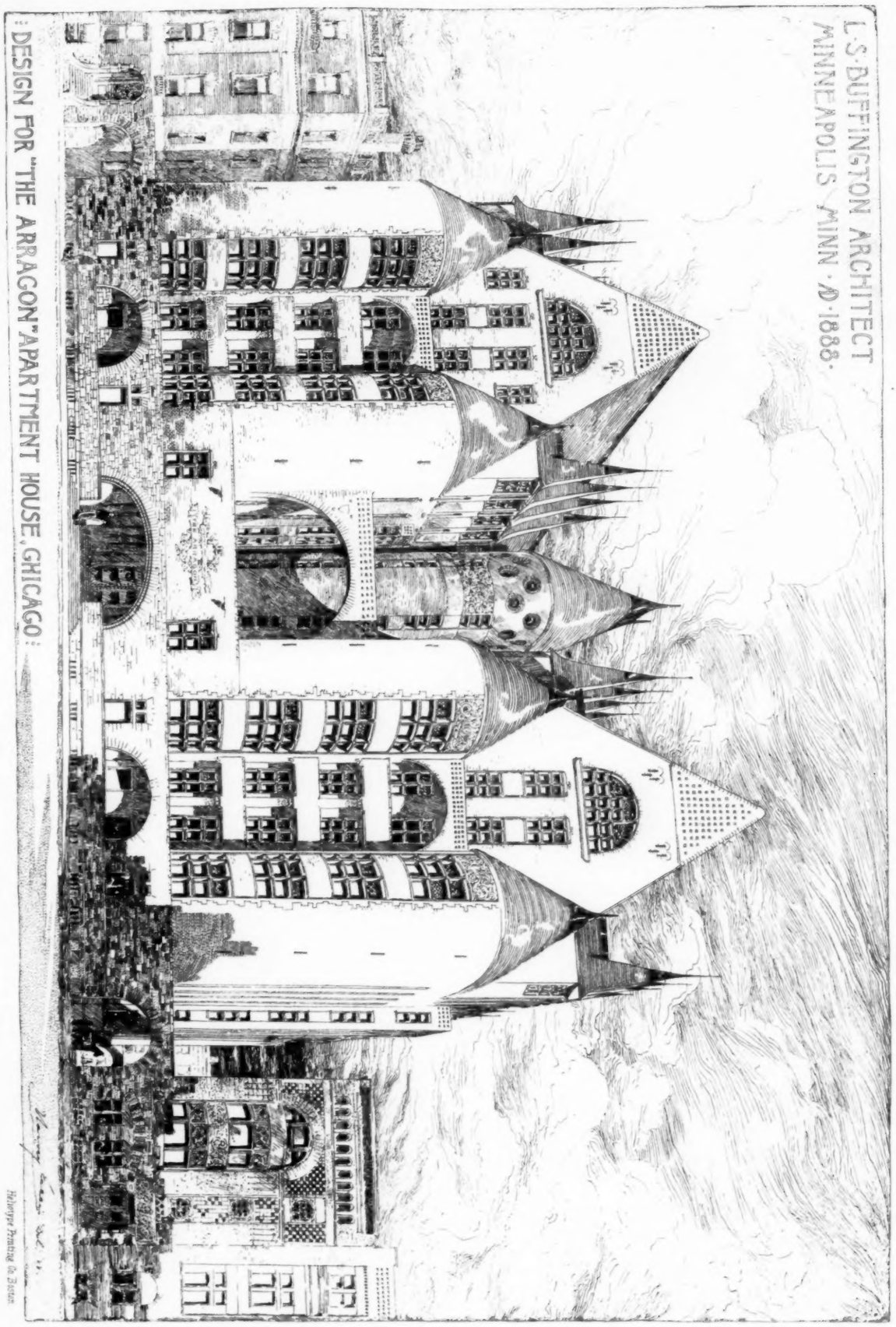
COPYRIGHT 1888 BY TICKNOR & CO



Rood-Screen for St. Johns Cathedral, Denver, Colo. Designed by Chas. R. Lamb.

Heliotype Printing Co. Boston

COPYRIGHT 1888 BY TICKNOR & CO



DESIGN FOR "THE ARRAGON" APARTMENT HOUSE, CHICAGO.

Heliotype Printing Co. Boston

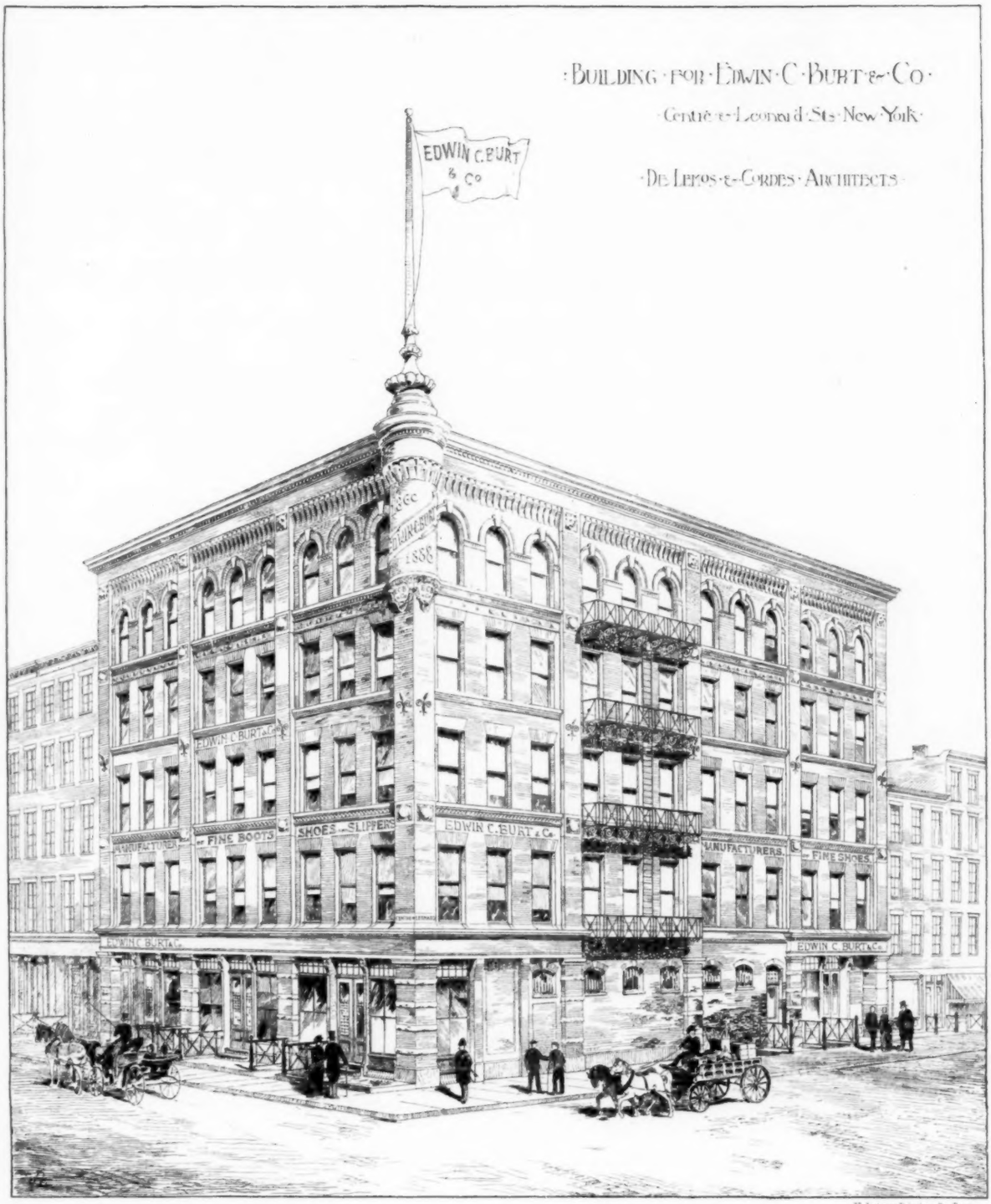
COPYRIGHT 1888 BY TICKNOR & CO

COPYRIGHT 1888 BY TICKNOR & Co

BUILDING FOR EDWIN C. BURT & CO

Centre & Leonard Sts New York

DE LEIOS & CORDES ARCHITECTS



Heliotype Printing Co. Boston.

became quieter the place, now named no longer Place Royale, but Place des Vosges, was adorned with a bronze fountain which remained there till, just before the Revolution of 1830, another equestrian statue of Louis XIII was erected in the year 1829. This time the statue was of marble, and was the work of Dupaty and Cortot.

The day on which destruction overtook the great equestrian statue of Louis XIV in the Place des Conquêtes, or de Louis le Grand, now the Place Vendôme, is by some given not as August 11, but as

Marble Statue of Louis XIII now in the Place des Vosges, Paris. Dupaty and Cortot, Sculptors.[1]

August 14, 1792, the day on which Louis XVI and his family were transferred to the Temple; and, further, that the work of destruction was going on as the carriage containing them came up and a halt was made that they might have full benefit of the sight and understand the love that their loyal lieges bore to the royal family and its belongings.

Lister in his "*Travels in France*" [1698] says: "This colossus of brass is yet in the very place where it was cast; it is surprisingly

Daniel of Volterra's Statue of Henri II, as it was to be.[2]

great, being twenty-two feet high, the feet of the king twenty-six inches in length, and all the proportions of him and the horse suitable. There was 100,000 pounds weight of metal melted, but it took not up above 80,000 pounds; it was all cast at once, horse and man. Monsieur Girardon told me he wrought diligently, and with almost daily application at the model eight years, and there were two more years spent in the moulding and furnaces, and casting of it. The king is in the habit of a Roman emperor, without stirrup or saddle, and on his head a French large periwig *à la mode*. Whence this great liberty of sculpture arises, I am much to seek."

This statue which was the work of the sculptor Girardon was one of the largest bronze statues of modern times and it was all the more remarkable that horse and rider were cast in one piece by a Swiss founder, Jean Balthazar Keler. It was erected August 13, 1691. The pedestal which supported it was of white marble.

Although Girardon's statue of Louis XIV was very effectively destroyed, records exist which show the merits of this, one of the most famous of modern equestrian statues: first, there is a model some three feet high in the Louvre which is said to be exact and authentic; next, there was exhibited in the Palais du Trocadéro, in

Model of Girardon's Statue of Louis XIV, now in the Louvre.[3]

1878, a statuette of cast-iron, gilded and damascened, which is not only interesting because it, too, is said to be a good miniature copy of the original, but because it is one of the earliest pieces of cast-iron

Cast iron Statuette of Louis XIV, after Girardon.[4]

work, at any rate of a sculptural character. It is the work of Maximilien Titon, an armorer who had a celebrated shop on the Place de Bastille; and because of his connection with the Government it was probably cast in the Arsenal, where was congregated all the knowledge and experience of the age in the matter of working metals.

In connection with Girardon's work, the story is told that he made and set up first another statue which was found too small for the site, and so was given to the Marshal de Boufflers, who subsequently gave it to the city of Beauvais, a gift which was received with enthusiasm by the young men of the city who went out to meet

[1] From M. Paul Marmottan's "*Les Statues de Paris.*"
[2] From Cicognara's "*Storia della Scultura.*"
[3] From Clarac's "*Musée de Sculpture antique et moderne.*"
[4] From the *Gazette des Beaux Arts.*

it, and, during the last few miles of its transit, dragged it in triumphal procession with their own hands.

Another bronze statuette, believed to have been made during the existence of the original, is also known and varies only slightly from the others.

There was also found in the cellars of the Louvre, which still

Bronze Statuette of Louis XIV, after Girardon.[1]

store many a forgotten treasure, a small plaster model of an equestrian figure clad in the costume of a cavelier of the period, and to this has been assigned, on no very satisfactory authority, the name of Louis XIV.

RICHELIEU'S INSCRIPTION FOR LOUIS XIII.

Pour la glorieuse et immortelle memoire du tres-grand et tres-invincible Louis le Juste. XIII du nom, Roi de France et de Navarre. Armand Cardinal de Richelieu, son principal Ministre dans tous ses illustres et genereux desseins; Comblés d'honneurs et de bienfaits par un si bon Maitre et un si genereux Monarque, lui a fait elever cette Statue: pour une marque eternelle de son zele, de sa fidelité, et de sa reconnaissance, 1639, (repeated in Latin).

Sonnet by Jean Desmarets de Saint-Sorbin of the Académie, engraved in Latin and French on the remaining faces of the pedestal:

Que ne peut la vertu, que ne peut le courage?
J'ai dompté pour jamais l'Hérésie en son fort;
Du Tage imperieux j'ai fait trembler le bord,
Et du Rhin jusqu'à l'Ebre accru mon héritage.

J'ai sauvé par mon bras l'Europe d'esclavage
Et, si tant de travaux n'eussent hâté mon sort,
J'eusse attaqué l'Asie, et d'un pieux effort
J'eusse du Saint Tombeau vengé le long servage.

ARMAND, le grand ARMAND, l'ame de mes exploits.
Porta de toutes parts mes armes et mes loix
Et donna tout l'éclat aux rayons de ma glorie.

Enfin, il m'éleva ce pompeux monument,
Ou, pour rendre à son nom mémoire pour mémoire,
Je veux qu'avec le mien il vive incessament.

DANIELE DA VOLTERRA, whose right name was Daniele Ricciarelle, was born at Volterra in 1509, and studied under Il Sodoma and Baldassare Peruzzi. He then went to Rome and found employment as assistant to Pierino del Vaga, and afterwards gained the friendship of Michael Angelo, who frequently assisted him with designs and instruction. Volterra's chief fame rests upon the series of frescos in the Capella Orsini in the church of La Trinita de Monte, upon which he labored seven years. The principal one is the famous "Descent from the Cross," the painter's masterpiece. After the death of Pierino del Vaga, Daniele was appointed by Paul III, upon the recommendation of Michael Angelo, to fill the post of superintendent of the works at the Vatican. His last great work as a painter is "The Murder of the Innocents," now in the Uffizi Gallery, at Florence. On the death of Pope Paul III, in 1549, Volterra was removed from his office of Superintendent, and appears to have devoted the latter part of his life to sculpture. He earned the name of "Breeches-maker" through having been employed to add draperies to some of the nude figures in Michael Angelo's "Last Judgment." He died at Rome in 1566.

JEAN PIERRE CORTOT.—Born at Paris, 1787. Died 1843. Pupil of the younger Boridan. Prix de Rome, 1809. Member of the Institute. His most noted works are "Daphnis and Chloe," in the Louvre; "The Soldier of Marathon," for the Tuileries Gardens; a statue of "Casimir Perier," for his tomb at Père La Chaise; "Marie Antoinette si stained by Religion, in the Chapelle Expiatoire"; The statues of the cities of Brest and Rouen, in the Place de la Concorde; "The Apotheosis of Napoleon," for the Arc de Triomphe; the sculptures in the the pediment of the Palais du Corps Legislatif; a group of "France and Paris," for the monument of the Duc de Berri; and an equestrian bas-relief of Louis-Phillippe in the Tuileries. He completed the equestrian statue of Louis XIII left unfinished by Dupaty.

CHARLES MERCIER DUPATY.—Born at Bordeaux, 1771. Died 1825. At first he studied painting, but at length devoted himself to sculpture under the teaching of Lemot. He won the Prix of Rome in 1799. His works are "Ajax pursued by Neptune," the principal group of the monument to the Duc de Berri, a group, "Venus discovering herself to Paris," and the statue of the Virgin for the Church of St. Germain des Prés, with others.

LOUIS XIII.—Eldest son of Henry IV. Born 1601. Died 1643. Nominally succeeded his father in 1610, at the age of nine, under the regency of his mother, Maria de' Medici, but, wearied of her control, he threw it off in 1617, and by the murder of her minister, Concini, became king, though compelled to carry on a civil war against his mother and her supporters for several years; become at length reconciled with her in 1624. Married Anne of Austria in 1615 Cardinal Richelieu was his prime minister for eighteen years.

LOUIS XIV.—Eldest son of Louis XIII. Born 1638. Died 1715. Succeeded his father at the age of five, under the regency of his mother, with Cardinal Mazarin for prime minister. Assumed full control at the age of fourteen. In 1660 married Maria Theresa of Spain.

FRANCOIS GIRARDON.—Born at Troyes 1630. Died 1715. He was assisted in his studies by Chancellor Seguier and became a reputable sculptor, being pensioned by Louis XIV while in Rome and receiving many commissions from him after his return. He was finally appointed Director and Chancellor in the Academy. His works include the well-known monument to Cardinal Richelieu in the Sorbonne and a "Rape of Proserpine" in the Gardens at Versailles.

[To be continued.]

[1] From the *Gazette des Beaux Arts.*

CANADA

MINERAL PRODUCTS.—CANALS.—TORONTO COURT-HOUSE.—QUEEN'S PARK, TORONTO.—THE ROYAL VICTORIA HOSPITAL, MONTREAL.—A COMPETITOR SUES FOR COMMISSION ON ACCEPTED DESIGN.—THE TRAFALGAR INSTITUTE COMPETITION, MONTREAL—VANCOUVER.

THE annual report upon mining and minerals of Canada for the year 1887 has just been issued, and furnishes us with some interesting statistics of the minerals in use by architects and engineers. The total value of the products all told is, in round numbers, about $15,000,000. The following are some of the items taken from the alphabetical list:

Product.	Quantity.	Value.
Brick, thousands.[2]	181,581	$986,689
Building-stone, cubic yards.	262,592	552,267
Cement, barrels.	69,843	81,900
Copper, pounds.	3,260,424	342,345
Flagstone, square feet.	116,000	11,600
Granite, tons.	21,217	142,506
Iron, tons.	76,330	146,197
Lead (pure in ore), pounds.	204,806	9,216
Lime, bushels.[1]	2,269,887	394,859
Marble and serpentine, tons.[1]	212	6,224
Mineral paint, tons.[1]	100	1,500
Pig iron, tons.	24,827	366,192
Slate, tons.	7,357	89,000
Steel, tons.	7,326	331,199
Tiles, thousands.	14,658	230,068

It would be a matter of considerable interest if some statistics of mineral products of the United States were published in this journal. There is always a quiet agitation going on for the further development of the mineral resources of the country, and there is certainly room for it, and there is, apparently, a great field of mineral wealth yet to be developed. If all the reports are true, we ought to supply our own coal: the number of tons yielded last year was 2,368,891, or $4,758,590 worth, while of gold 66,270 ounces, or $1,178,637 worth.

I have turned up some interesting statistics about the Canadian canals and their lengths mentioned in my last letter as forming so magnificent a waterway in connection with the rivers and the lakes, of 2,500 miles length. The total distance from the Straits of Belle Isle to Duluth—the head of the inland navigation on Lake Superior—is 2384 statute miles. Ten canals of a length aggregating seventy-one and one-half miles connect the rivers below and above the falls or rapids; the difference of levels amounting to 600 feet, of which the Canadian canals, with fifty-three locks, overcome a height of 532¾ feet. The Saulte Sainte Marie Canal, built by the United States, has only one lock, lifting eighteen feet. The sizes of the locks on this system range from 200 to 270 feet long by forty-five feet, and a depth of from nine feet to fourteen feet. The Government undertakes to make the whole route available for large vessels.

The canal route from Montreal to Ottawa and Kingston, on the Lake Ontario, has a total length of 246 miles with fifty-nine locks, and this is exclusive of the Lachine Canal (near Montreal) ten miles long and a lockage of 533½ feet. The new works on this route give nine feet of water in locks, forty-five feet by 200 feet. Canal communication between the St. Lawrence River and the city of New York is secured by means of the Richelieu River and the Chambly Canal. It has nine locks with seven feet of water, and is connected with the Erie Canal and the Hudson River, giving a length of 411 miles. Of the Trente River Navigation between the Lake Huron and the Bay of Quinte (Lake Ontario) is 235 miles, a part only being navigable chiefly for the passage of logs or timber, and 155 miles are available only for vessels of small draught. Finally, there is the St. Peter's Canal cut through an isthmus half a mile wide between St. Peter's Bay on the Atlantic and the Bras d'Or Lakes of Cape Breton. This canal has one lock forty-eight feet by 200 feet, and a depth of eighteen feet. A new canal on Canadian soil is contemplated at Saulte Sainte Marie, which will make us independent of the American canal. These improvements will greatly facilitate the national carrying trade and give it a stimulus.

Here is something further about that long-promised Toronto Court-house "competition." It will be remembered that in the competition

[2] Not fully reported.

all the drawings were rejected because it was agreed by the committee that none of them could be carried out for the stipulated sum of $200,000. The tenders for the new building, those already accepted by the Committee, amount to $1,225,034, in addition to which must be added $80,000, the estimated cost of plumbing and steam-heating, for which no tenders were received; also $25,000 for contingencies, and $75,000 for furniture and the architect's commission, etc., making a total of $1,405,034. To meet this there is already in bank a sum of $823,000, the balance, $582,000, has to be raised from the rates, and it is intended to submit a by-law at the earliest opportunity for voting on. It was also proposed by some bright member of the Committee to submit the question as to whether white or red stone should be employed for facework, but this last piece of folly was voted down.

The Canadian Pacific Railway Company is making rapid progress with its works both in Toronto and Montreal, whereby it will enter both cities by a less circuitous route than at present. Nearly all the land has been purchased and the required facilities from the city have been obtained, and we may soon hope to see these much needed reforms take place.

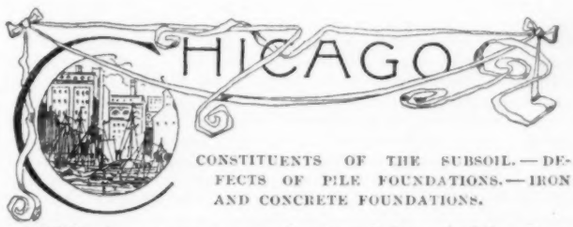
It will be remembered that in a former letter an account of the serious trouble existing between the city and the University of Toronto over the unfulfilled conditions on the part of the city, of their lease of the Queen's Park, which is the property of the University, and how, for a time, the lease was hopelessly cancelled by the University, thus depriving the public of the use of a considerable area laid out as a park and taking away two principal thoroughfares that happened to cross this property. The University authorities have certainly behaved well in the matter, and have succeeded in waking up the sleepy aldermen to a sense of their duties, and through the energetic action of the mayor, terms have been arranged by which the Queen's Park will remain as it is for the rest of the years of the original lease. A considerable amount of trouble has been expended naturally, time and money in legal advice, and so on, but it has finally been agreed that the pending action of the University against the city shall cease, and that the *entente cordiale*, which should exist between the Corporations, shall be restored. All previous breaches of covenant on the part of the city shall be waived, and all existing street openings into the Park and avenues shall be allowed to remain without objection being raised on the part of the University. This secures again to the citizens for 970 years (the remainder of the term of the original lease) the Queen's Park as it is. The University is to dedicate in perpetuity two avenues valued at $350,000, one of which is absolutely necessary, as it is at present a main thoroughfare. These and sundry clauses of agreement have been arranged, and the citizens have to thank the University Corporation for their courtesy in allowing a settlement so greatly to the advantage of the city to be arrived at, when, apparently, it was for them to dictate terms and in their power to demand what they chose.

The Toronto Free Public Library has on its shelves some two dozen volumes of great interest recently "found" we are told by the Librarian. They consist of MSS. containing records in connection with the Government of the Province of Ontario, from its earliest days, with special reference to Toronto and its immediate neighborhood. These books were originally the property of a Mr. David W. Smyth, surveyor-general of the Province in those early days: they contain records of all his property which was very considerable. A plan is given of the city of Toronto and also the first known plan of any building in Toronto; namely, the house of this Mr. Smyth, with elevation in color and the plan of the garden and stables. But what is of greater interest is that it proves certain changes to have been made in the names of two or three streets, which discovery clears away a difficulty known to searchers of land titles, who until now have been unable to account for the want of agreement between descriptions of property and the actual plans. For instance, a description of a lot say on Duchess Street, corresponds with a lot on Duke Street and with no other, the old or original name for the street is now shown to have been "Duchess." When or why the change was made does not yet appear. Original minutes of the Government Council of 1796–97 up to 1800, with original letters of Governor Suncoe and several other interesting papers are among the MSS.

The long-talked-of Royal Victoria Hospital of Montreal is to be built at last. Over a year ago two wealthy citizens, Sir Donald Smith and Sir George Stephen each gave the large sum of $500,000 to build and endow a hospital to be erected on a certain site the property of the city, if the city would give the site for the purpose. A little below this site is one of the large reservoirs that supply the city with water, and a great cry was raised by both English and French that the water would be contaminated by means of the Hospital if erected there. In their difficulty the Hospital Committee of the Corporation referred the matter to two well-known doctors, one of each nationality, who were separately to report as to the probable result of erecting the hospital on this site. It was a sensible step to take and would undoubtedly set the matter at rest, deciding the controversy one way or the other. Not a bit of it. The Doctor's reports were exactly the opposite of each other. The Englishman in a long and exhaustive report in which he submitted evidence of similar situations in all parts of the world showed most conclusively that the water would not be in the least danger of contamination. The Frenchman's report went to prove the folly of erecting the hospital on this site, and so "when doctors differ," etc., the Committee were worse off than before. There the matter stood; Mr. Saxon Snell was sent for to look at the site and prepare plans, a really excellent move on the part of the Committee and one which, if the idea originated with themselves, ought to redeem them at least from the characteristic of pigheadedness of Corporation Committees in general. Nothing was heard further for a long while; but the idea gained ground that considering the diversity of opinion on the matter it would be wiser at any rate, if possible, not to build there. Fully recognizing the difficulty the most liberal donors have come forward again with another offer. They consent to a change of site and give a further sum of $80,000 for the purchase of another site. Making this the final condition on which the total of $1,080,000 shall remain to be used for this object. Naturally this has been accepted and so the "Jubilee" hospital will no doubt be commenced at once. Such princely gifts do not occur every day and it is a pity so long a time should have been allowed to elapse, but it was an awkward predicament for a corporation to be in. The advent of Mr. Saxon Snell caused some disappointment among the local professional men. It was at least hoped the hospital would have been competed for, but I fancy Mr. Saxon Snell would really have been the author of the successful design by a local man, through the medium of his great work on hospitals, which would have been largely consulted no doubt.

With regard to competitions they certainly have not proved a happy method of settling the matter in question, in Montreal particularly, where there has been one advertised. A lamentable case was that of the competition for the Trafalgar Institute, a "College for the Higher Education of Women." The competition was advertised in a feeble kind of a way because the same Sir Donald Smith offered to give $25,000 towards the building if begun by a certain date. When intending competitors applied for particulars, they were told there were none: the Committee did not understand that architects would necessarily like to know something of what was wanted. However, the Committee put their heads together and a list was produced of the rooms, etc., required. Designs were sent in and as usual in cases of this kind the good men on looking at them were totally bewildered. After a long time, however, a decision was arrived at, but when tenders were in for the chosen design they exceeded the amount by so great an extent, that the design had to be thrown out. The next chapter bowled the Committee over. Mr. Sorby, the author of the design, proceeded to take out an action against them to recover the amount of commission on the building as carried out according to his plans, claiming that the wording of the instructions admitted of an interpretation as to cost which justified him in acting as he did. The action has not yet been gone on with, so far as I can learn, and the new building is still where it was three years ago. What arrangement may have been arrived at is as yet not made public even to other competitors, and in the meantime the architect of the chosen design has moved from Montreal to Vancouver.

Mention of Vancouver, reminds me that it is the youngest city of the Dominion, and a child of great promise it appears to be. Four years ago it had no existence. In July, 1886, it had a population of 1,200, July, 1888, that had increased to 8,500 which leads sanguine statisticians to hazard the remark that by July, 1889, the population will be 20,000. It certainly has a good future before it. As the terminus of the Canadian Pacific Railway and the new port for communication with China, India and Australia, it ought to rise rapidly and in time become a very important city. In connection with this I may mention that Owen Sound on the Lakes, the inland port in the route from east to west, mentioned in my letter, last month, gives another sign of improving according to this morning's papers. It is stated "that owing to the increased traffic on the Main Street, the Town Council have decided to open up and place in proper condition the street along the east side of the river," etc.; this ought to be a sign of considerable progress.



CONSTITUENTS OF THE SUBSOIL. — DEFECTS OF PILE FOUNDATIONS. — IRON AND CONCRETE FOUNDATIONS.

DURING the past season several extremely heavy buildings have been commenced here, and in watching the operation of putting in their footings and foundations one cannot but be impressed with the changes that have taken place during the last ten years in this branch of building.

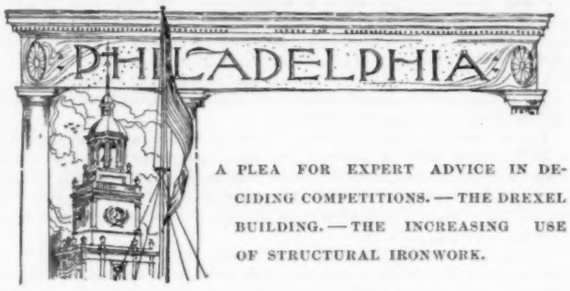
Owing to the fact that the soil under that part of the city where the heaviest buildings have recently been erected is unusually poor for heavy foundations, probably more experiments have been made and more experimental kinds of footings have been put in at Chicago than in all other parts of the country put together. In a general way the soil in this part of the city may be said to consist of three strata, of which the first is sand for a depth of some eight or ten feet. This sand is generally quite clean and fairly sharp, of yellowish color, and evidently a deposit formed under the water when in some, not very remote

geological period, this portion of the country was entirely beneath the waves of Lake Michigan. In most parts of the city where the soil has never been disturbed by previous building operations this sand enters largely into the common mortar for brickwork, although not coarse or sharp enough for rubble-work or of sufficiently good quality to be used for plastering or fine work. Continuing to a greater depth beneath this stratum of sand is a clay, bluish in color, and for the first few feet quite hard in composition, so that a pick-axe is often necessary to make any progress in it, but after these few feet it gradually becomes softer until at a depth of something like eight or ten feet it has become about the consistency of lard, a formation that continues of a practically homogenous character for a depth of nearly fifty feet until bed-rock is reached.

When the first heavy buildings were erected the only method of footings that seemed to receive attention, or possibly it would be nearer the truth to say that the only method that was known as applicable to such poor soil, was the system of piling. Very shortly, however, it was found, principally owing to the nature of the clay, tnat there were numerous and very important objections to this. In the first place, it was very expensive: and in the second place, piles even when once driven into the clay were not fixtures until loaded, for the driving of an adjoining pile had the tendency to cause No. 1 to pop up again. Owing to the great difficulty of properly and accurately proportioning according to their weights the number and distance apart of the piles, the buildings even when once placed upon them had the tendency to settle unequally, and as these piles could just as easily go down through the soft clay an additional twenty feet as they had gone the first fifteen, they frequently started on this downward career with anything but happy results for the building. The system of piling was, however, practically abandoned within a few years after the great fire, partially on account of the expense but more particularly because of the unsatisfactory results. This method was employed in some of the public buildings, as among the last examples of its use, but the results as now seen have probably rather emphasized the opinion already formed, and probably no architect would now propose to use, under ordinary circumstances, this system.

The principle gradually became recognized and was slowly acted upon, that the foundations should not be sunk to any great depth but should spread out rapidly and as near as possible at the top of the clay hard-pan. But as this idea was acted upon, it soon offered one great objection, that the cellars became of no practical value as they were filled up with a host of stone pyramids which received the columns and piers of the building proper. Even with dimension-stone in the footings it was not found desirable to make offsets of more than fourteen to eighteen inches at the very greatest, so that as the buildings became higher and heavier, the pyramids became larger and larger until it was evident that some means must be found to enable greater offsets to be made on each course, and consequently correspondingly reduce the size of the pyramidal foundation. Probably one of the first important steps in this direction was in the footings of the new Board of Trade Building, where large timbers were introduced into the concrete. From timber to iron was but a step, still it was *the* great step that very materially changed the character of our extremely heavy foundations. It was indeed a radical change which was quickly taken advantage of and very quickly brought to the point where now used. In the earlier uses of iron a heavy footing of concrete was first laid down and upon this railway iron was tightly placed side by side until the entire concrete was covered, then concrete was slushed in between and another course of rails similarly laid but at right angles to the first course, and this in its turn thoroughly slushed up with concrete, and a thin coat of the same on top. This course of the footing was then complete and an offset of three feet was considered admissible. Thus an enormous weight could by means of several such large offsets very quickly be distributed over a large surface of footing. This was the starting-point and the main principle of our present system of heavy foundations, but it has with slight variations, as necessitated by different requirements, been played up and down the whole scale of foundation construction until now scarcely a heavy building is erected but that the footings contain more or less iron. If railroad irons were good why were not I-beams better, and acting upon this principle many beams as wide as 12 inches, have been used until the quantity of iron stored away in some of these foundations, makes of them veritable iron mines. The question had often been raised but never (certainly in your correspondent's hearing) been very satisfactorily answered, what will be the lasting qualities of the iron thus embedded in the concrete. Isolated cases of iron in concrete are cited but the conditions are generally different and most of the parties contend, apparently more because they wish it to be so than because they have any strong array of proof, that beyond a thin coating of rust the iron will remain perfectly intact for ages. Certainly it is to be hoped that such will be the case, but as for the actual proof of using iron under similar conditions it would seem as if very few actual examples can be cited, and that the future architects only, will be able to judge more fully upon this point.

The latest experiment that seems to have been tried is to cover — before commencing the footings — the entire area of the excavation of the building with a thick stratum of concrete laid directly upon the top of the clay hard-pan. The depth of this course is nearly two feet and its object seems to be to strengthen the clay so that the general settlement may be reduced to a mininum. Aside from this experiment, as far as noticed, the foundations of all the new buildings this year have been practically the same as during the last few seasons, still no one would be surprised to have at any moment some entirely new scheme tried, for every one is on the lookout to see if something still better and at the same time less expensive is not possible.



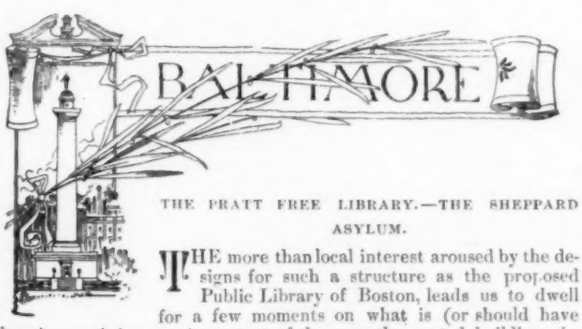
A PLEA FOR EXPERT ADVICE IN DECIDING COMPETITIONS. — THE DREXEL BUILDING. — THE INCREASING USE OF STRUCTURAL IRONWORK.

IT is not to be supposed that the complete satisfaction given to everybody connected with the Art Club Competition recently brought to such a successful close by Professor Ware will change at once the existing system, or rather want of system, in conducting competitions in Philadelphia. The architects can do much, however, by taking a firm stand in the matter at the first opportunity. No doubt there would be strong opposition at the beginning from the building public, and from those architects who rely on their powers of persuasion rather than on their powers of design; but one can easily see what immense good would result to the city if invited architects would refuse positively to go into any competition not based upon expert judgment. This Utopian method of deciding on the relative merit of designs submitted in competition will be slow of general adoption mainly because the public has an unwarrantably high opinion of its own judgment in such matters. In America people are in the habit of criticising a new building with as much assurance as though it were a new book. In the case of a book the average American's opinion would be worth something. He has grown up among books as he has among buildings, but with this important difference, that, whereas the buildings he is obliged to see are for the most part bad, or, at least, without merit, it depends entirely on himself whether the books he reads shall be of the best or of the worst that the world has ever produced. Ignorance of the classics of literature is more or less a matter of choice; to know the classics of architecture, an American must have had time and money in plenty. When we consider that besides this the amateurs of architecture are comparatively few, it is all the more surprising that men, even sensible, hard-headed business men, who would not be willing to stake much on the correctness of their judgment as literary experts, have of late adopted the plan of holding competitions for important buildings, and appointing themselves judges of the designs, when so far as the probability of their choosing the best design is concerned, a jury of shoemakers would be quite as likely to choose the best out of half-a-dozen landscapes, or a congress of dentists decide on the merits of a steam engine. The folly of this kind of decision becomes all the more apparent when the other requirements of the competition are subordinated to the usual "handsome front" clause of the programme. But it is unprofitable to speculate as to what kind of design can least afford to be judged by laymen, and this whole discourse on the harrowing subject of competitions would be unprofitable if it were not for the hope that some architects may be found willing to demand the simple right — one that is not accorded but insisted on by the public in all professions and arts except architecture — the simple right of having their designs judged by experts. When this ideal state of affairs shall have come to pass that corporations about to build shall put their work into the hands of some architect of established reputation, or shall call in an expert to aid their judgment by pointing out in the competitive designs the merits and defects that only a professional would notice until the building was under way, then and not before will be the end of the numberless sham competitions where the award is made to the man who has the strongest "pull."

Some months ago, in speaking of the causes that led to the dissolution of the Knights of Labor, I had occasion to mention the immense amount of marble used in the Drexel Building. This is one of the latest of Messrs. Wilson Bros. & Co.'s works. It is just finished, and as it is the largest and most important office-building in Philadelphia, a notice of some of the special features of its construction will not be out of place. In size it is very nearly the same as the Equitable Building in New York, covering rather less ground, but being three stories higher. The plan is like a huge letter H, and the dimensions — according to the *Public Ledger*, which is authority for many of the following points as well — one hundred and forty-two feet by two hundred and twenty, and the elevations show a cellar, a basement story, ten other stories and an attic, bringing the roof to a height of one hundred and thirty-five feet above the pavement. On the west is Fifth Street, on the north Chestnut, and on the east and south Custom-House Place and Library Street. In the middle of the Chestnut Street front (the upper half of the "H")

stands the Independence National Bank, occupying the only part of the block not owned by Mr. Drexel, who has torn down to make room for his new building, the Law Building, as well as the old Philadelphia Library, and the old post-office, the quarters of the last two having been swept farther up town by the irresistible westward tide of business. The space below the cross of the "H" corresponding to that occupied by the Independence Bank is left as an open court. The effect of the Chestnut Street front is somewhat marred by the little bank tucked in between the two towering marble wings of the Drexel Building, more especially as, owing to some disagreement about the terms on which light might be taken for the new building above the bank roof, there are no windows in the marble facing of the party-wall. That so large a building should have been finished so quickly as this one is almost phenomenal, for it was only seventeen months ago that the work of excavating was begun. The unusually open weather of the first part of last winter was of the greatest help, as was the now universal covering-in and heating of the building during the progress of the work, but a new method of construction — almost unknown before in this city — should have the largest share of the credit. In order to get the greatest amount of light and room, the windows were made as large as possible, and the piers as small. Up the middle of each pier runs an iron column, and on these columns rest the floor girders, so that the masonry has nothing but its own weight to carry. The four largest marble quarries in the country were kept busy during the work, but even they could not supply material fast enough, so that the building would have been seriously delayed if it had not been possible to go on with the iron framework without waiting for its marble covering. At one time, in fact, the floor beams were in position four stories higher than the top of the walls. The south-east corner of Fifth and Chestnut Streets was, and still is, occupied by the banking-house of Drexel & Co. It was desired to incorporate it in the new building, and this has been done with the utmost success, from an engineer's as well as from an architect's point of view. The ceiling of the banking room reaches the fifth floor of the new building, and the problem was to support the six upper floors and attic of the latter on top of it. Girders of sufficient strength would have been greatly in the way, and no columns could be set up in the banking-room without being a serious disfigurement. The floors above are, therefore, held up by enormous trusses, running up through four stories, where they help to make partitions between the offices. The iron boxes on which the ends of these trusses rest are, to be sure, on the inside of, and anchored to, the banking-room wall, but as they were put up at night and after banking hours in the daytime, their erection in no way interfered with business, and their covering of colored marble makes them rather an interesting feature than an eyesore. The rooms above the Board of Trade room (which is on the second floor of the eastern wing) are supported in the same manner. In the new building for the Provident Life and Trust Company, by the way, that is just begun a little farther down Chestnut Street, Mr. Furness has adopted a similar method of construction, where a higher truss even than this, the shape of the lower part of a letter "A" holds floor upon floor suspended from its upper angles.

In spite of the enormous advantages that the modern use of iron gives to the architects of to-day in such cases as this, so that, as in the Drexel Building, we may have, with a comparatively limited ground area, four hundred rooms all admirably lighted, and without an ounce of combustible material in their construction, it is to be doubted whether this increasing use of constructional ironwork is an unmixed blessing. As to its artistic effect, it will certainly be hard in the future, if experiment continues to open to us new capabilities in ironwork, to design a building that shall be really good if we are to keep getting the stone shell of it divided into smaller and smaller piers at the base, and the building itself towering higher than ever before. Perhaps it is not too conservative a wish to hope that the same causes that have led the Pennsylvania Railroad management to discard iron bridges for stone in the future, to the immense relief of people who have the slightest regard for landscape beauty, will bring about the abandonment of the wholesale use of iron in our city buildings.



THE PRATT FREE LIBRARY.—THE SHEPPARD ASYLUM.

THE more than local interest aroused by the designs for such a structure as the proposed Public Library of Boston, leads us to dwell for a few moments on what is (or should have been) one of the most important of the recently erected buildings in Baltimore, the "Pratt Free Library."

It would be a difficult task to criticise, or in any way describe, the results of the gift of one million dollars, made in the lifetime of the donor, where an unprejudiced opinion would force one even to admit that only absolute perfection had not been attained, without suggesting a lack of appreciative gratitude antagonistic to the natural responsive feeling of the community, kept aglow, as it always is, by the unintelligent commendation of the local press. Such criticism should only be written or read in the spirit that can completely separate the sincerity and generosity of the motive actuating the gift from the success or failure, from whatever cause, of the completed result. It is not a common thing, even in these days when large gifts and bequests to public objects often seem to follow closely in the wake of custom, or indeed of fashion, that an unsolicited and unexpected donation of a million dollars, in round numbers, is presented to a city, representing a large proportion of the total wealth of the donor, who in the course of one or two years sees his entire scheme embodied and in complete working order. Very rarely indeed would such an event be designated by an intelligent and unbiassed critic as "a calamity." Such, however, is the rather startling term we have heard applied in this case, and we will let the facts speak for themselves, questioning whether the word "calamity" is really misapplied to any rare opportunity conspicuously misused, from the sad point of view of "the might have been," — the unfortunate influence of precedent, the inevitable future recognition of the truth, and the consequent dissatisfaction.

The gift was accompanied by certain conditions relating to the details of the endowment that more or less influenced the development of the scheme, but which need not be discussed here, when merely an outline description of the building itself will serve the purpose.

The location, though near the centre of the city, is upon an unimportant, narrow street, which can never become a thoroughfare, and is in the middle of a block with unattractive surroundings, whereas the acquirement of a portion of the block immediately adjoining the present buildings, on which are only old dwellings, would have given one of the best possible positions, on a corner, with a frontage on a broad street, directly facing the great Ionic portico of the Cathedral and the open space around it. The front portion of the library building occupies the entire width of its lot, some seventy feet, more or less, with a dead wall at either end, abutting onto the adjoining property, which on one side is encumbered by out-buildings of objectionable character. The façade is a two-storied white marble screen, with florid decorations, which has doubtless been designated as "modernized Britain Gothic," suggesting almost anything but that a public library is hid behind it. The floors and walls of the entrance hall and stairway are covered with an elaborate pattern of various marbles and tiles in a style of design frequently seen of late years in many buildings devoted to less dignified purposes. Some half-dozen rooms in this front portion of the building are appropriated to registration, to the delivery and return of books, and to the board of management; while the rear, in the form of a long rectangular structure on the main axis, narrowed sufficiently to obtain light on both sides, contains, in two low-pitched stories, the "nests" of shelving for the books, with a more lofty reading-room above, at the extreme end of which is the librarian's sanctum and some toilet rooms.

The completion of this building is a rather remarkable instance of the very rapid—perhaps we might say more forcibly the very hasty—consummation of a benevolent scheme, in striking contrast to one or two others now in progress in Baltimore, conspicuous among which is the "Sheppard Asylum" for the cure of the insane — apparently those of a future generation, although the institution has already been in existence as a corporation for thirty-five years. Undeniably there is great need of security in the care of trust funds, but, without stopping to question the details of the management in this particular case, one cannot help feeling that this and some other trusts in the city are in the hands of certain men of undoubted integrity, but whose interest and pride seem to be rather in the safe and clever financiering than in the active philanthropy of the schemes which they have in charge.

The trustees of the Sheppard Asylum were incorporated as a body by the Legislature in 1853, with Moses Sheppard as president. Four years later he died, at the advanced age of eighty-four. By his will he devised the whole of his estate, with the exception of a few small bequests, to the "trustees of the Sheppard Asylum," absolutely without any limitations, instructions, directions or requests. His trustees, however, thoroughly understood his intention and design in founding the institution, as they were his personal friends, in constant and intimate intercourse with him, and among some written memoranda the following extracts were found: "My design is an institution similar to one near Philadelphia, belonging to the Society of Quakers, and, like that, under the direction of that description of persons principally. My desire is, all for use, nothing for ornament; the farm-house style; fireproof as far as practicable; a small and expensive institution; an experimental establishment; each person shall have an attendant when it may appear useful; first for the poor of the Society, secondly for such of the Society as are able to pay, and then for the poor indiscriminately; afterwards the trustees will use their discretion. *My leading purpose is* to found an institution to carry forward and improve the ameliorated system of treatment of the insane, irrespective of expense; an experiment in a small way for about seventy-five men and seventy-five women; all of them to have privacy, sunlight and pure air; and everything done for the comfort of the patients." And he several times reiterated

the condition that "the income and not the principal is to sustain the institution."

The whole amount of the estate realized was something less than $600,000, and the average net income, after all the expenses were paid, has been about $24,000 per annum, all of which has been expended in the purchase and improvement of the property, and the erection of the buildings.

In 1858, a farm of three hundred and seventy-seven acres, about six miles from the city on Charles Street Avenue, was purchased for $70,000, and there has since been expended on the buildings, and improvements of various kinds, $758,000. The first stone was laid in 1862, and the last brick on the main buildings in 1879. In addition to this, a separate building has been erected for the water-tower, heating, ventilating and laundry purposes, communicating by a large tunnel and various branching sub-ways under all parts of the building, in which are placed all the necessary pipes, radiators, etc.

The Asylum proper consists of two buildings separated by about one hundred feet, each covering an area of about 25,000 square feet, and each three full stories and basement in height, designed for the separate accommodation of the two sexes. It is claimed that the buildings are as fireproof as iron stairways, brick-arched ceilings, slate roofs, etc., can make them.

The work has reached the point towards its final completion when the plastering and flooring is about finished. All the woodwork fitting-up of the interior remains still to be done, also all the details of heating, ventilating, plumbing, draining and lighting. It is maintained, too, that what has already been accomplished is most thoroughly done, and is the best possible of its kind, both as to the material and workmanship, and that the progress of such work could not have been more rapid under the conditions of a fixed and limited annual expenditure. Recently the possibility of hastening active operations by concentrating all the energy upon the completion of one wing was taken into careful consideration, but finally abandoned as not advisable; and it is now stated that it will require about four years' additional income to complete the entire scheme. So that a review of the facts given at present would make it appear that in 1892 the institution will be ready to enter upon its good work with an invested endowment of considerably over half a million of dollars and with its buildings and grounds representing nearly twice that amount.

For a long time its roofs and towers have been familiar and interesting features in the landscape. Having grown so slowly, its more immediate surroundings, its gate lodges, its driveways and its shrubbery, have grown around and with it, have lost all look of crude newness, and almost seem to be old landmarks. Only the idleness and loneliness about the place seems unnatural and weird, but perhaps not more so than, when in the future, it will become the home of its unfortunate inmates — unfortunate surely — but, let us hope that this great institution, in the fulfilment of its mission, will make them less unhappy.

SOCIETIES

TECHNISCHER VEREIN VON NEW YORK.

AT the annual meeting of the "Technischer Verein" (German Technical Society) of New York, held October 13, the following officers were elected:

President, G. W. Wundram, M. E.; Vice-President, E. A. Gieseler, C. E.; Corresponding Secretary, H. W. Fabian, Architect; Recording Secretary, H. Berg, M. E.; Librarian, F. Knauer, C. E.; Trustees, A. Kurth, C. E., P. Göpel, C. E., O. Fuller, M. E., A. Dörflinger, C. E., E. L. Heusner, M. E., A. v. d. Driesch, Architect, Th. Breyer, Chemist.

The number of members at present are:

Civil Engineers, 49; Mechanic Engineers, 111; Architects, 36; Chemists, 37; Total 233.

NOTES AND CLIPPINGS.

Under Ground Four Miles to the Theatre. — In some countries it would seem strange for a party going to see a theatrical entertainment to make a dive into Mother Earth, travel four miles under the mountains, and then dart up to the surface within a stone's throw of the ticket office, but it is after such a fashion that some of our people go to their regular dose of drama, comedy and tragedy. Last night a party of ladies and gentlemen of the town of Sutro, who wished to see "The Two Johns" at the opera-house, took the subterranean cut. Starting at the mouth of the Sutro tunnel, at their own doors, they came up the tunnel to the C. and C. shaft, a distance of a little over four miles. Dismounting from the cars they then boarded the cages in the shaft and were shot upward to the surface, a vertical distance of 1,640 feet. This way of going to the theatre is as much fun for our ladies as going to a picnic. It is really a pleasure, but until a lady has become somewhat accustomed to life in the mines it requires a little nerve. It is fine and cool the whole four miles under ground. The cars will not soil even the most delicate dresses of silk and satin, therefore there is no trouble of changing clothing. In her room at the mouth of the tunnel a lady may stand before her mirror and give the finishing touch to flower or feather, and in just such shape as she turns from her glass she is shot up to the surface in this city, ready to take her seat in the box in the opera-house. — *Virginia City Enterprise.*

TRADE SURVEYS.

Mention has been made of the rapid utilization of artificial fuel in the manufacturing establishments of the country. Quite a competition is in progress between them. There are ten or twelve methods in use, all of them are valuable in their way. Engineers are working at various economies and extending the application of fuel to a greater variety of uses. One of the most successful systems in use melts over 1,000 tons of steel, with a consumption of three gallons of oil per ton of steel. The price of artificial fuel ranges in price from 3 cents to 5 cents. Within a year the cost has been very greatly reduced, and engineers and manufacturers are confident of still further reducing it. Another interesting feature is that artificial fuel is being introduced into a number of the smaller manufacturing establishments in the country. In a comparatively short time ten manufacturing establishments will be using artificial fuel, where one is using it now. It is a strong factor in reducing the cost of production, and it is for this purpose that we have made reference to it. The characteristic of modern manufacturing activity is the steady decline in cost of production in every department. A wide field is open to enterprise and skill in the reduction of the cost of fuel. Authorities differ as to the permanency of the natural-gas supply, and this very feature is stimulating capital to find artificial substitutes. Within the past week or so two companies have been formed for the introduction of artificial fuel upon a large scale in several of the large manufacturing cities. Natural-gas companies are not asleep: they have been extending their lines in Pennsylvania and Ohio. A thirty-six-inch pipe has been laid a distance of five miles, and is the largest in the world; this pipe has been laid in the city of Pittsburgh. Another line has been laid from Murraysville, a distance of eleven miles. Several eight, ten and twelve inch lines have also been laid. A twenty-inch pipe, twelve miles long, connects Murraysville with a town called Grapeville, which promises to be a thrifty, industrial centre. Two ten-inch pipes have just been laid across the Alleghany River, near Pittsburgh. During the past year another company made three thousand contracts to supply private houses. Schemes are under consideration for extending the natural-gas supply from cities now remote from sources of supply. A new field has been developed in Kentucky, and a pipe-line is to be laid at once to reach to the nearest manufacturing centres. In other directions there is no declining tendency. The cost of labor in nearly all industrial centres will likely remain the same.

The cost of iron, steel, lumber, petroleum, leather, coal, iron and woodworking machinery, shop work, including all kinds of boiler and engine work, as well as tools and implement works, will remain at the present level at least. In some directions prices are going upward. The only present advantages to be found in the direction of lower prices are in the cost of transportat on and in fuel. Leading lumber authorities state that the most encouraging feature of the present situation is the stability and upward tendency of prices. Surplus stocks are light. Throughout the West the demand has been steady and large all season. Both East and West dealers have reported a steady depletion of their stocks. The distribution of lumber throughout the West is considerably hindered by the scarcity of cars. The improvement in cities like Omaha, Kansas City, St. Louis, Minnesota and many other western and northwestern cities has been enormous and profitable for active building operations. Receipts of lumber at Chicago this year have been more than 130,000,000 feet, more than up to same time last year. Throughout the West there is a steady distribution of lumber of all kinds. Southern supplies are coming forward liberally. There is a very active competition in the southwestern section of the country due to the multiplication of saw mills and planing mills. Throughout the country lumber manufacturers expect to maintain present rates of prices throughout the winter, and enter upon the spring trade with moderate supplies, a good demand and bright prospects. The large crops of cereals is already having its effect upon those industries which look to the agricultural regions for their markets. For some months past there has been a lull in the machinery and implement branches. Within one or two weeks several of the agricultural implement establishments in the West have booked large orders for winter work. This is especially noticeable in woodworking machinery and in establishments which turn out small steam engines. It is also observable throughout the Western shops where machinery is supplied to be operated by gas or electricity. As so often stated, the demand for machinery and mechanical appliances is fully as large at this time as it has been for years. There is a general displacement going on of old machinery for new, because of the economies being brought about by improvements in machinery. The locomotive works throughout the country have booked large orders during the past thirty days. Four firms are working day and night. Within the past three weeks a number of car-building works have started night-work. A great many orders are coming in and railroad companies are in a position where they will be obliged to place large car-building orders before the close of the year.

The railroad situation is brighter upon the surface than beneath it. The gross earnings are large, but the net earnings are small. The bulls have been endeavoring for three months to so manipulate stocks and railroad returns, as to induce the outside public to rush in and seek to buy. They have not accepted the invitation and there will be no participation in stock speculation this fall by the outside public. A good deal of uneasiness arises on account of the moderate earnings (net) but in the long run the influences of the reduced earnings will be healthful rather than the reverse. As intimated recently, a good deal of new railroad work is going on. Large rail contracts have not yet been placed. The managers of iron and steel works are declining to enter into heavy contracts for late delivery. Textile manufacturers are generally complaining of small orders. The desire of dealers is to not go into debt, as long as it is possible for legislative interference to suddenly depress the market value of stocks in hand. Distributors of all kinds of textile and manufactured products throughout the West are buying and carrying as light stocks as possible on this account. There is a general anxiety among borrowers and business men carrying stocks on credit to make prompt payments. The possibility of a reaction and a depression seems to be widely entertained. Failures this year are in point of numbers but little in excess of last year. The figures being 7,677 and 7,310 respectively to this date. In money markets there is a decided tendency toward a further rise of rates. The movement of funds to the interior is heavy and for systems along the Atlantic coast. The demand for first-class bonds continues large among the professionals. There is an abundance of money throughout the East waiting permanent investment and less than usual seeking purely speculative channels. The total East-bound rail shipments of bread stuffs from Chicago for last week reported was 30,331 against 25,373 tons for same week last year. There has been an advance in freight rates between Chicago and other Western cities of from forty to sixty cents on first class railroads. Rates to intermediate points will be advanced next Monday. There are prospects for a general harmonizing of interests since the Canadian Pacific and the Soo lines have joined in the upward movement.

S. J. Parkhill & Co., Printers, Boston.